FLORA

OF

BRITISH INDIA.

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BY

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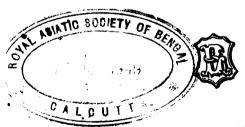
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ASSISTED BY VARIOUS BOTANISTS.

VOL. VII.

CYPERACEÆ, GRAMINEÆ AND GENERAL INDES.

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PREFACE TO VOL. VII.

THE length of time, upwards of a quarter of a century, occupied in the publication of the Flora of British India, has resulted in the later volumes containing a far more complete account of the families of plants to which they are devoted than do the earlier volumes of theirs.

For this there are two reasons, the extension of the area of British India in the interval, and the many collections that have been transmitted to Kew from wholly or imperfectly explored regions of India during the same interval.

The extension of area has been: on the East, Munnepore, and by far the greater part of Burma, adding many Indo-Chinese genera and species to the flora; on the West, British Beluchistan and other trans-Indus hills and valleys, adding Oriental genera and species. Neither of these extensions have, however, added so much to the Indian flora as might have been expected; for, as regards Burma, extensive materials were already available from Pegu, Martaban, Tenasserim, and the upper and lower Irawaddy valleys; and as regards the West, the low country Oriental flora is represented in the plains of Sind and the Panjab, and the upland and alpine in the trans-Indus valleys, Western Tibet, and the Kashmir Himalaya.

On the other hand, the collections received from previously unexplored and partially explored regions of India proper have been numerous and full of novelty and interest. Of these the first in importance are Mr. C. B. Clarke's, whether for their extent, the knowledge and judgment with which the specimens were selected, ticketed, and preserved, or for the valuable observations which accompany them. They were obtained over a greater extent of India than had been traversed by any other Indian botanist, and at all elevations, up to 18,500 ft., from the bend of the Indus at Gilgit, Kashmir, and Western

vi PREFACE.

Tibet, in the extreme West; from Sikkim, Bengal, Assam, and Munnepore in the East; from Behar, Central India, and Chota Nagpur in the centre; and from the Nilghiri Hills in the South. Next in importance are the Malay Peninsula collections made by Father Scortechini, the Messrs. Curtis, Wray, Hervey, Hullett, Merton, and Ridley, and by collectors sent by Dr. King from the Botanic Gardens of Calcutta. These latter have added several hundred species to the genera described in the first volume alone of this Flora, and have been published by Dr. King in the Journal of the Asiatic Society of Bengal. Thirdly rank Mr. Duthie's copious and excellently preserved collections made in Kashmir, Western Tibet, Garwhal, Kumaon, Rohilkund, Rajmahal, and Central India, and Dr. Aitchison's from the Kurrum and other valleys west of the Indus.

Of the works upon Indian Botany that have appeared during the publication of Flora of the British India, the more important are Mr. C. B. Clarke's "Composite Indice" (1876); Mr. Kurz's "Forest Flora of Burma" (1876); Dr. Brandis' "Forest Flora of N.-W. and Central India" (1874); Col. Beddome's "Flora Sylvatica of Southern India," vols. i. and ii. (1869-73), and his "Icones Plantarum Indiæ Orientalis," vol. i. (1874); Dr. Trimen's "Handbook of the Ceylon Flora," Parts i.—iii. (1893-5); and Dr. King's "Annals of the Botanic Gardens, Calcutta," vols. i.—vii. (1888-1897), which include illustrated monographs by himself and other Indian botanists of the Indian species of Ficus, Quercus, Pedicularis, Magnoliaceæ, Anonaceæ, Bambusæ, &c.

In the Preface to the first volume of this work I have stated that it was proposed to include in it the Ferns and their allies. This intention has been abandoned, owing to the appearance of excellent available works describing the Indian species, especially Hooker and Baker's "Synopsis Filicum" (1874); Col. Beddome's "Review of the Ferns of N.-W. India" (1880), and his "Handbook of the Ferns of British India" (1883), with Supplement (1892).

Having regard to this "Flora of British India," I must remind those who may use it that it has no pretensions to give full characters of the genera and species contained in it. It aims at no more than being an attempt to sweep together and systematize within a reasonable time and compass, a century of hitherto undigested materials scattered through a library of botanical books and monographs, and preserved in vast collections, many of which latter had lain unexamined for bulf a

PREFACE. VII

century in the cellars of the India House and in public and private herbaria. It is a pioneer work, which, besides enabling botanists to name with some accuracy a host of Indian plants, may, I hope, serve two higher purposes, to facilitate the compilation of local Indian floras and monographs of the large Indian genera; and to enable the phytographer to discuss the problems of the distribution of plants from the point of view of what is perhaps the richest, and is certainly the most varied botanical area on the surface of the globe, and one which, in a greater degree than any other, contains representatives of the floras of both the Eastern and Western Hemispheres.

J. D. HOOKER.

November, 1897.

ADDENDUM.

Vol. vii. p. 416, under 2. S. chilianthum, insert habitats:
Singapore, Wallich; Malacca, Stevens. Distrib.: Java, Sumafra.

FLORA OF BRITISH INDIA.

ORDER CLXXIII. GRAMINEE.

ERECT decumbent or creeping herbs, or in Tribe Bambuseæ shrubs or trees. Stem terete or compressed, jointed; internodes solid or hollow. Leaves simple, usually long and narrow, entire, parallel-nerved, with a sheathing base distinct from the blade; sheath split to the base (very rarely entire) with often a transverse hyaline erect appendage (ligula) at the union with the blade, facing the latter. Inflorescence terminal, rarely also from the upper sheaths, consisting of spicate racemed capitate or panicled spikelets. Spikelets of three or more alternate distichous bracts (glumes), of which the two lowest are normally empty, and the succeeding. if more than one, are arranged on an axis (rachilla), and are all or some of them flowering; within each flowering glume and opposite to it is an erect narrow 2-nerved scale (palea), the margins of which are infolded towards the glume and enclose at the base the true flower. Flowers uni- or bisexual, consisting of 2, rarely 3 or 6 microscopic scales (lodicules) representing a perianth, and stamens or a pistil, or both. Stamens 3. rarely 1, 2, 6, or very rarely many, hypogynous; filaments capillary; anthers versatile, fugacious, of two parallel cells, with no apparent connective; pollen globose. Ovary entire, 1-celled; styles 2, rarely 3, free or united at the base, usually elongate, and exserted from the sides or top of the spikelets, clothed with simple or branched stigmatic hairs; ovule erect, anatropous. Fruit a seed-like utricle (grain) free within the fig. glume and palea, or adherent to either or both; pericarp very thin, rarely thick or separable from the seed. Seed erect; albumen copious, mealy; embryo. minute, at the base of and outside the albumen; cotyledon soutelliform, bearing on its face an erect conical plumule, and descending conical radicle.

Genera about 300; species estimated at about 3000, but many are doubtful, and

more mere varieties; natives of all climates and regions.

In working up the grasses for this Flora, I find the multiplication of species to have passed all bounds, and their nomenclature to be involved in a corresponding degree. This has arisen from two principal causes, from authors not taking into account the wide area over which the individual species of grasses range,* and from the imperfection of the descriptions of the earlier and many later authors. It is sixty-two years since Kunth published his "Agrostographia Synoptica (Tubingen, 1838), which is an uncritical sweeping up of all previously known supposed genera and species, with imperfect descriptions and synonyms. It was succeeded (in 1836) by a second volume, in which a few hundred species of the first volume are very fully and accurately described, and valuable notes upon others are added. In 1856 Steudel's "Synopsis Graminum" appeared. It in no respect advances, and in many ways retards the student of the Order. Of more recent works on Gramines, three only are of great mark, namely, Munro's very able Monograph of the Bassesses Trans. Linn. Soc. vol. xxvi. (1868); Bentham's revision of the genera, Gea. Plant. vol. iii.

It is a fact familiar to every one who examines collections of plants from hitherto unexplored countries, that novelties amongst the grasses are very few indeed, compared with what occurs in other natural families.

(1883), a work of remarkable completeness and accuracy, considering the chaotic condition in which the author found the Order; and Hackel's admirable monograph of the Andropogones in A. de Candolle "Monogr. Phanercg." vol. vi. (1889), the

largest and most difficult Tribe of grasses.

I have cited synonyms to a much greater extent in this than in any other Order described in the "Flora of British India" (except the "Cyperacees" by Clarke) with the view of aiding the researches of future authors. Many of these synonyms had never been fixed with any approach to exactness, and many were for the first time identified during Mr. Jackson's and my labours on the "Index Kewensis." [cannot expect that all will prove to have been satisfactorily reduced, and still less that all have been brought to light.

Referring to the classification of the Indian genera, I have been compelled to diverge somewhat from Bentham's arrangement, and to abandon some of his Tribes and Subtribes, in many cases following Hackel's more recent and well-considered views. These divisions throughout the Order are of very unequal value, and are as difficult of delimitation as of definition upon any fixed principles. They are, indeed, in some cases arbitrary, and in others more or less artificial. In this matter, and in the description or revision of some of the very difficult genera, I have derived great aid from Dr. Stapf, Assistant in the Herbarium of the Royal Gardens, who has lately been instructed by the Director of Kew to study and name the materials in that Herbarium critically. As Dr. Stapf shares my views as to the wide ranges of the species, and the undue multiplication of their synonyms, his labours may be expected to yield far-reaching results, taxonomic, morphological and geographical, and to modify some of the conclusions arrived at in the following attempt to methodize the Indian Graminecs. As affecting the numbers and synonyms taken from "Wullich's List." I have to observe that for some of them I have had to depend on the ticketed duplicates in Herb. Hook, and Benth., the types being wanting in the Wallichian collection in the rooms of the Linnman Society.

Spikelets articulate on their pedicels, or Series A. Panicaceæ. deciduous with them, 1-2 fld., upper fl. alone (if 2) fruiting.

Exceptions. Spikelets inarticulate on their pedicels in Arundinella and Isachne. Spikelets articulate on their pedicels, or with articulate pedicels occur in Poacea, in Alopecurus, Cyathopus, Polypogon, Fingerhuthia, and Lophatherum. Upper flower alone fertile in Tribe Phalaridea of Poacea, and in Tristach, a.

I. Rachis of infl. inarticulate, or subarticulate in Stenotaphrum. gl. usually coriaceous or herbaceous.

Tribe I. Panicez. Spikelets 2-fld., upper fl. bisexual, lower male or neuter, rarely both fertile. (Spinifex is diocious.)

Spikelets articulate on their pedicels, except Isachne and Arundinella.

+ Spikelets not involucellate by bristles.

& Spikelets not awned (gl. II and III beaked or awned in Pan. Crus-galli). (See also Tricholæna and Arundinella.)

Spikelets dorsally flattened, base not thickened : gls. 3.

with very rarely a minute fourth (lowest). Spikelets of Paspalum, but with a thickened basal callus. Spikelets subglobose, panicled; gls. 4, I and II sepa-

rately deciduous, subequal Spikelets panicled or spicate, gls. 4 (2 in P. subeglume)

I and II very rarely subequal, if and III awned in

P. Crus-yalli, IV rarely very shortly awned.
Spikelets of Panicum, but gl. IV. narrowed into a short, flattened stipes, or with 2 appendages near the base . Spikelets innumerable, very minute, hairy, densely crowded in the capillary branches of a very large panicle

- PASPALUM.
- 2. ERIOCHLOA.
- 3. ISACENE. '
- 4. PANICUM.
- 5. ICHNANTHUS.
- 8. THYSANOLENA.

Spikelets panicled, branches of panicle produced beyond	
the uppermost spikelets; gl. I minute, hyaline	7. Chamæraphis.
Diœcious, male spikelets in clustered spikes, fem. soli-	-
\$\$ Spikelets awned, except in some sp. of Tricholana	8. Spinifex.
and Arundinella. Spikelets of Panicum, but nerves of gl. II broadly	•
fimbriate, and pales of III deeply cleft, IV awned Spikelets silky; gl. I 0, or minute and distant from II	9. Axonopus.
and III with usually capillary awns. Spikelets solitary or fascicled on a simple rachis or the	10. TRICHOLÆNA.
branches of a panicle; gl. I long awned. Spikelets persistent on the pedicels, or gls. I and II separately deciduous, IV deciduous; usually awned, awn	11. OPLISMENUS.
bent	12. ARUNDINELLA.
†† Spikelets each surrounded by an involucel of bristles.	
** Spikelets persistent on their pedicels, at least the their pedicels.	fertile, or deciduous with
† Spikelets in involucelled deciduous fascicles.	
Involuced of bristles	14. PENNISETUM.
Involuced of spines connate at the base	15. CENCHRUS.
†† Spikelets not involucelled. Spikelets 2-seriate on a flat subarticulate rachis Spikelets (at least the fertile) 1-seriate on an inarticulate	16. STENOTAPHRUM.
flat rachis, the base of which dilates and encloses a	17. THUAREA.
Tribe II. ORYZEÆ. Spikelets 1-fid., articulate deciduous from them. Palea 1-3-nerved. Stamen	
Spikelets 2-sexual, awned or not; gls. 4, I and II minute	•
or setaceous	18. ORYZA.
Spikelets 2-sexual, awnless; gls. 2, broad, thin	
Spiretota 2-st Zdar, division Bio. 2, orotal, said	19. LEERSTA.
Spikelets 2-sexual, awned; gls. 2, narrow, thin	19. LEERSIA. 20. Hygrorhiza. 21. Leptaspis.
Spikelets 2-sexual, awned; gls. 2, narrow, thin	20. Hygrorhiza. 21. Leptaspis.
Spikelets 2-sexual, awned; gl. 2, narrow, thin Spikelets 1-sexual; fruiting gl. inflated; leaves broad Tribe III. ZOYSIEE. Spikelets 1-fld., deciduo	20. Hygrorhiza. 21. Leptaspis.
Spikelets 2-sexual, awned; gl. 2, narrow, thin Spikelets 1-sexual; fruiting gl. inflated; leaves broad Tribe III. Zoysie. Spikelets 1-fld., deciduor 2-sexual, or some imperfect. * Spikelets fascicled. Spikes geminate; fascicles unilateral	20. HYGHORNIZA. 21. LEPTASPIS. ns with their pedicels, 22. TRACHYS.
Spikelets 2-sexual, awned; gl. 2, narrow, thin Spikelets 1-sexual; fruiting gl. inflated; leaves broad Tribe III. Zoysie. Spikelets 1-fld., deciduot 2-sexual, or some imperfect. * Spikelets fascicled. Spikes geminate; fascicles unilateral Spikes solitary; fascicles quaquaversal; gl. III echiuate. ** Spikelets solitary, rarely 2-nate.	20. HYGHORNIZA. 21. LEPTASPIS. ns with their pedicels, 22. TRACHYS.
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Spikelets 2-sexual, awned; gl. 2, narrow, thin Spikelets 1-sexual; fruiting gl. inflated; leaves broad Tribe III. ZOYSIEE. Spikelets 1-fld., deciduot 2-sexual, or some imperfect. * Spikelets fascicled. Spikes geminate; fascicles unilateral Spikes solitary; fascicles quaquaversal; gl. III echinate. ** Spikelets solitary, rarely 2-nate. Racemes slender; pedicels flattened; gl. I and 1I muricate.	20. Hyghorniza. 21. Leptaspis. ns with their pedicels, 22. Teachys. 23. Teagus.
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Spikelets 2-sexual, awned; gl. 2, narrow, thin Spikelets 1-sexual; fruiting gl. inflated; leaves broad Tribe III. Zoysie. Spikelets 1-fld., deciduot 2-sexual, or some imperfect. * Spikelets fascicled. Spikes geminate; fascicles unilateral Spikes solitary; fascicles quaquaversal; gl. III echiuate. ** Spikelets solitary, rarely 2-nate. Racemes slender; pedicels flattened; gl. I and 1I muricate Raceme slender; spikelets minute, base of gl. I saccate Spike very slender; spikelets narrow; gl. I and II	20. Hygrorhiza. 21. Leptaspis. ns with their pedicels, 22. Trachys. 23. Tragus. 24. Latipes. 25. Lopholepis.
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Spikelets 2-sexual, awned; gl. 2, narrow, thin Spikelets 1-sexual; fruiting gl. inflated; leaves broad Tribe III. Zoysie. Spikelets 1-fld., deciduot 2-sexual, or some imperfect. * Spikelets fascicled. Spikes geminate; fascicles unilateral Spikes solitary; fascicles quaquaversal; gl. III echiuate. ** Spikelets solitary, rarely 2-nate. Racemes slender; pedicels flattened; gl. I and II muricate Racemes slender; spikelets minute, base of gl. I saccate Spike very slender; spikelets narrow; gl. I and II awned Spike rigid; spikelets appressed to the rachis, not awned II. Rachis of inflorescence usually articulate Tribe IV. Andropogoner. Spikelets usually in the infl. 3-nate, pairs homo- or heterogamous.	20. Hyghorniza. 21. Leptaspis. ns with their pedicels, 22. Trachys. 23. Tragus. 24. Latipes. 25. Lopholepis. 26. Perotis. 27. Zoysia. 2-nate. or the terminal
Spikelets 2-sexual, awned; gl. 2, narrow, thin Spikelets 1-sexual; fruiting gl. inflated; leaves broad Tribe III. Zoysie. Spikelets 1-fld., deciduot 2-sexual, or some imperfect. * Spikelets fascicled. Spikes geminate; fascicles unilateral Spikes solitary; fascicles quaquaversal; gl. III echiuate. ** Spikelets solitary, rarely 2-nate. Racemes slender; pedicels flattened; gl. I and II muricate. Raceme slender; spikelets minute, base of gl. I saccate Spike very slender; spikelets narrow; gl. I and II awned Spike rigid; spikelets appressed to the rachis, not awned. II. Rachis of inflorescence usually articulate. Tribe IV. Andropogones. Spikelets usually	20. Hyghorniza. 21. Leptaspis. ns with their pedicels, 22. Trachys. 23. Tragus. 24. Latipes. 25. Lopholepis. 26. Perotis. 27. Zoysia. 2-nate. or the terminal

Subtribe I. MAYDEM. Spikelets spicate, all 1-sexual; male spikes in terminal panicles, or continuous with the fem spike.

Subtribe VI. ROTTBOELLIER. Spikele's homo- or hetero-gamous, 1-2fid., solitary, or 2- rarely 3-nate on the internodes of an articulate spike or raceme, not awned (gl. I candate in Vossia); gl. I not keeled, adnate to or sunk in a depression formed by the internode and pedicel of the

upper spikelet; gls. of sessile spikelet 4. Spikelets 2-nate, gl. I caudate.

45. VOSSIA.

Spikelets 2-nate, gl. I flat

46. ROTTBORLLIA.

Spikelets 2-nate, gl. I globose Spikelets solitary, gl. I convex

third imperfect; gls. 4 .

47. MANISURIS. 48. OPHIURUS.

Subtribe VII. RATZEBURGIEE. Spikelete homogamous, 3-nate on the slender internodes of a solitary flattened fragile spike, two perfect, 1-fld.,

49. RATZEBURGIA.

Subtribe VIII. EUANDEOPOGONEE. Spikelets heterogamous, 1-fld., 2rarely 3-nate on the whorled articulate branches of simple or compound racemes or panicles (solitary in Cleistachne); gls. 4, I not keeled, IV usually awned.

Spikelets 2-3-nate, in a simple spike, gl. I with tuber- cled penicillate ribs	50. ELIONURUS.
panicle	51. CLEISTACHNE.
criform whorl round the pedicelled fem	52. Germainia.
Spikelets 2-nate, or the uppermost 8-nate, spicate, or panicled	58. Andropogon.
Spikelets in 2 superposed series; upper series of heterogamous pairs, and a terminal male, lower a whorl of	
4 persistent males or neuters. Spikelets as in Anthistiria, but male and neuter spikelets	54. Anthistibia.
deciduous with the fem.; callus 0	55. ISBILEMA.

Series B. **Poacess.** Spikelets continuous (not articulate with) their pedicals, 1- many-fid.; rachilla articulate at the base, and often between the fig. gls.; lowest fl. always fruiting, upper often male or nenter.

Exceptions. Upper fl. alone bisexual in Phalaridex. Spikelets articulate on their pedicels, or gl. 1 and II separately deciduous occur in Alopecurus, Melica, Fingerhuthia, Cyathopus, and Sphærocaryon.—See under Panicaces some genera with spikelets inarticulate at the base.

Tribe V. Phalabides. Spikelets with a terminal perfect fl., and one or more imperfect male or neuter below it; rachilla not produced beyond the perfect fl.

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Panicle contracted or spiciform; spikelets awnless . . 56. Phalaris.

Panicle spiciform; gls. 6, 111 and IV neuter, awned;
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Subtribe VI. AGROSTIDEE. Spikelets 1-fid.; rachilla jointed at the base, produced or not beyond the fig. gl.; gls. 3, I and II empty, III fig. awned.

Exceptions. Spikelets sometimes 2-fid. in Sporobolus and Mushlenbergia.

Subtribe I. STIPEE. Spikelets panieled; rachilla not produced beyond gl. III; fl. gl. rigid or hard, awned (except Milium).

Subtribe II. Philodole. Spikelets in spiciform or subspiciform panieles, gl. III hyaline, loosely wrapping the grain; stigmas exserted from the top of the spikelet.

Subtribe III. EVACEOSTEE. Spikelets usually small, in open or contracted many-fid. panicles; gls. usually thin or membranous; stigmas laterally exserted from the spikelet. Spikelets rarely 2-fid. in Sporobolus and Muchlenbergia.

U	OLAZIII. GRAMINEA. (J. D. MO	UKE.	·.)
	* Rachilla not produced beyond gl. II.	•	·
01	† Spikelets articulate on their pedicels, or gl. I and pedicel articulate in the middle.	II.	separately deciduous,
S	pikelets oblong; gl. I and II 8-nerved, III 5-nerved, awnless	67	. CYATHOPUS.
	pikelets very narrow; gl. I and II 3-nerved, III faintly 1-3-nerved, usually awned	68.	GARNOTIA.
	pikelets compressed; gl. I and II subequal, awned, nerved	6 9.	Polypogon.
	nerved, awnless		SPHÆROCARYUM.
G	†† Spikelets and pedicels inarticulate, gl. I and II per ls. all awnless; I and II 1-nerved, pericarp of grain	-8181	e71.0. ·
	loose	71.	Sporobolus.
	dorsal or 0	72.	AGROSTIS.
	minal	73.	MUEHLENBERGIA.
	with long hairs	74.	CALAMAGROSTIS.
cil	late with long, silky hairs; gl. I and II 3 nerved.	7 5.	DEYEUXIA.
	Tribe VII. AVENEE. Spikelets 2- or more fld. cicate, or panicle subspiciform; fl. gls. usually a	, p	anicled, very rarely
ar	d often twisted, rarely straight or 0; rachilla pre upper fl. gl.	rodu	ced or not beyond
	Subtribe I. AIREE. Spikelets 2-fld.; gls. memoduced.	bra	nous; rachilla not
	. I acute, many-nerved; fl. gl. long-ciliate		ERIACHNE.
Su	ikelets minute; rachilla and keel of fl. gl. ciliate ikelets awnless; gl. III largest 2-sexual, IV mule		Zenkeria. Coelachne.
	ikelets 3-nate; gl. I and II awnless, III male, cleft, awned in the cleft .	79.	TRISTACHYA.
Gi	I. I and II awnless, III and IV bisexual, hyaline, dorsally awned	80.	AIRA.
٨ı	Subtribe III. EUAVENEE. Spikelets 2- or mo	ore	fld.; rachilla pro-
S	nikelets 2-fid., both bisexual, swned	81.	DESCHAMPSIA.
•	or neuter awned	81	. Holcus.
-	ikelets 2-6-fld.; fl. gl. awued, awn subterminal or dorsal	82.	Avena.
Sţ	ikelets 8- or more-fid.; fl. gl. deeply cleft, awned in the cleft	83.	DANTHONIA.
	Tribe VIII. CHLORIDEE. Spikelets 1- or mor		
fo	mes very distantly) and secund on an inarticulaterm branches of a slender panicle; fl. all or the		
ra	chilla produced or not beyond the upper fl. gl. * Spike solitary, terminal (see also Chloris).		
	pikelets minute, 1-fld., awnless ikelets 1-2-fld., in pedicelled deciduous articulate	84	MICROCHLOA.
-	clusters, awned		GRACILEA. Enteropogon.
	oikelets many-fid.; fl. gl. 3-awned		TRIPOGON.

** Spikes or spiciform branches digitate, racemed or panicled (or solitary in Chloris). Spikes digitate, 1-fid., upper imperfect fl. 0 88. CYNODON. Spikes solitary, spicate or racemed; spikelets 2- or morefid., upper fl. imperfect 89. CHLORIS. Spikes digitate or whorled; spikelets 3-6-fld., densely crowded, awnless 90. ELEUSINE. Spikes racemed on a long rachis; spikelets 2-3-fl.i., 91. DINEBRA. Spikes panicled, filiform; spikelets very minute, alternate, 92. LEPTOCHLOA. 1- or more fld., awnless Spikes very long, filiform, simple or divided; spikelets 93. DICHETARIA. very few, distant, 1-fld., awned Tribe IX. FESTUCACEE. Spikelets 2- or more-fld., pedicelled, rarely sessile, in effuse or contracted rarely spiciform, panicles; rachilla articulate at the base and often at the base of the fl. gls., always produced beyond the uppermost fl. gl. Subtribe I. PAPPOPHOREE. Spikelets few- or many-fld.; gls. manynerved, fl. gls. many-awned or 4-5-lobed. Spikelets spicate, 2-5-fld.; empty gls. 4, 2 upper and flg. 94. POMMERRULLA. 4-lobed; fl. gl. with a dorsal awn . Spikelets in simple or branched spikes; fl. gl. many-awned 95. PAPPOPHORUM. Subtribe II. ARUNDINEE. Spikelets panicled, 2- many-fld.; gls. very narrow, fig. penicillate with long silky hairs on the callus or sides or both, lowest fl. gl. sometimes male or neuter. Rachilla elongate, glabrous; fl. gl. silkily hairy 96. ABUNDO. Racbilla very short; fl. gls. glabrous, callus with long . 97. PHRAGMITIS. silky hairs Subtribe III. Sesleries. Spikelets in spiciform panicles, or in spicate clusters with (in the Indian species) many imperfect spikelets of imbricating gls. at the base of the spike or of the clusters, 1- or more-fid. (Cynosurus has dimorphous spikelets). Spikelets in a cylindric spike, articulate on very short pedicels; gl. I and II awned 98. FINGERHUTHIA. Spikelets very minute, in globose clusters on an elongate 99. ELYTROPHORUS. simple rachis Spikelets in a dense unilateral panicle, uppermost of each branchlet 1-fid., concealed by the longer lower empty . 100. Lamarckia. gls. . Spikelets in spiciform clusters, uppermost of each cluster 2-5-fld., lower of distichous subulate empty pectinately arranged gls. . 101. CYNOSUBUS. Subtribe IV. ERAGROSTEE. Infl. various. Spikelets 2-many-fld.; fl. gls. 1-3-nerved, entire, 3-toothed, 3-lobed or 3-awned. Panicle spiciform; spikelets 2-5-fld.; fl. gls. scarious, 102. KORLERIA. secund, mucronate or shortly awned . Panicle effuse; spikelets 2-4-fid.; gl. I very short, 3-nerved, sub 3-toothed, fl. gl. broadly truncate, 3-. 103. CATABROSA. nerved Infl. various; spikelets many-fid.; empty gls. shorter thun the lowest fig. gl., 1-nerved; fig. gls. 3-nerved; . 104. ERAGROSTIS. grain very minute, terete .

Infl. pyramidal; spikelets many-fid.; empty gl. longer

0	ODAXIII. GRAMINEZE. (J. 17. FLOOKER.)
Infl.	than the lowest, gl. II subulate, 1-nerved; fig. gls. 3-nerved; grain broad, concave subpanicled; spikelets many-fid.; empty gl. shorter than the lowest fig. gl. I 3-nerved, II 5-nerved; rachilla silky; fig. gls. 3-nerved, grain grooved capitate in the (Indian sp.); spikelets few or many- fid.; empty gls. shorter than the fig., I 1-3-nerved, II 5-nerved; fl. gls. 3-nerved, villous; grain broad, concave 107. Coelachyeum. telets sessile on the spiciform branches of a tall, broad panicle, many-fid.; fl. gls. 3-4-toothed 108. Diplachne.
mar	Subtribe V. Melice. Spikelets usually panicled, 1—or more-fid.; gls ny, upper smaller, empty, convolute in a clavate mass. I and II separately deciduous
rach	Subtribe VI. CENTOTHECE. Spikelets 1— many-fld., 1—2-seriate on the is of a simple spike or on the long slender branches of a simple punicle. saves broad, tessellately nerved.
Spik Spik	elets 1-fid., secund and articulate at the base; upper gls. empty, convolute with setiform tips 110. LOPHATHERUM. elets 3- or more-fid., secund, persistent; fruiting gls. with reflexed submarginal bristles
fl. gl	Subtribe VII. EUFESTUCEE. Spikelets usually panicled, 2- or more-fid.; is. 5- many- (very rarely 3-) -nerved, upper empty or 0; styles short ept Duthima). (Spikelets of Brachypodium in long very lax spikes of uropus in crowded spikes.)
Spik Spik Spik	elets many-fid., subspicately crowded; ff. gl. broad, many-nerved. Prostrate, leaves rigid, pungent . 113. ÆLEUROPUS. elets few-fid., in close secund clusters; gl. l and II shorter than the mucronate or awned fig
Spik Spik	branches, awnless. Annuals elets ovate, in a lax pyramidal panicle, pendulous; gls. inflated, awnless, closely imbricate, many-nerved, dorsally convex 117. Beiza. elets laxly panicled, few-fld.; gls. kceled, 5-nerved (3- in P. persica), awnless, nerves rarely meeting at the tip 118. Poa.
· Spik Spik	elets laxly panicled, 1-2-fld., awnless; gls. hyaline, flg. very broad, truncate, 5-nerved, lateral nerves very short elets panicled, many-fld., awnless; gls. obtuse, dorsally rounded, 5-9-nerved, lateral nerves short lets panicled, many-fld.; fl. gls. acute or awned,
Spik Spik	dorsally rounded, top of ovary naked or hairy
	· · · · · · · · · · · · · · · · · · ·

Tribe X. Horder. Spikelets 1- or more-fid., sessile, 1-2 or more seriate on the rachis of a simple spike, or partially sunk in cavities of the same; rachilla usually articulate and produced beyond the fig. gls. into a naked or glumiferous bristle; gls. awned or not, I and II opposite or subcollateral, persistent or separately deciduous. I sometimes absent or very minute.

Subtribe I. LOLIEE. Spikelets solitary at the nodes of the spike; plane of the spikelets radial to the rachis.

Subtribe II. Tritices. Spikelets solitary at the nodes of the spike; plane of spikelets tangential to the rachis.

Subtribe III. ELYMEE. Spikelets 2 or more, collateral or fascicled atthe nodes of the spike; plane of spikelets tangential to the rachis.

Tribe XI. Bambusez. Shrubby or arboreous grasses. Leaves flat, jointed on the sheath. Spikelets 1- ∞ -fld.; lower 2- or more gls. empty, gradually increasing in size up to the flowering, with sometimes small terminal imperfect ones. Palea usually large, 2-keeled (in Melanocanna). Lodicules usually 3. Stamens 3, 6, or ∞ . Styles 2-3.

Subtribe I. Arundinaries. Palea 2-keeled; stamens usually 3; pericarp thin, adnate to the seed.

Spikelets 1- many-fid., racemed or panicled; empty gls.

1-2

Spikelets 1-4-fid., spicate; spathes bracteate; empty gls.

2-3

133. Phyllostachys.

Subtribe II. EUBAMBUSEE. Palea usually 2-keeled; stamens 6; pericarp thin, adnate to the seed.

Subtribe III. DENDECCALAMEÆ. Palea 2-keeled; stamens 6; pericarp fleshy or crustaceous; seed free.

Spikelets 2-fld. as in Dendrocalamus; ovary glabrous at the top, fruit large, pericarp fleshy . . 139. MELOCALAMUS. Spikelets 1-fld., loosely spiked on the branches of the panicle, bracteate; fruit small, depressed-globose; pericarp crustaceous . 140. PSEUDOSTACHYUM. Spikelets 1-fld. as in Pseudostachyum; fruit elongate beaked, pericarp crustaceous 141. Teinostachyum. Spikelets 1-fld., bracteste, crowded in globose heads; fruit oblong, beaked, pericarp thick, separable . . 142. CEPHALOSTACHYUM. Subtribe IV. Melocanner. Spikelets 1-fld. Palea 0 or glume-like. Stamens $6-\infty$. Pericarp crustaceous or fleshy, seed free. Spikelets in clusters on the branches of the panicle, rachilla produced far beyond the fl. gl.; fruit small, pericarp 143. SCHIZOSTACHYUM. Spikelets very minute, clustered on the branches of the panicle, rachilla not produced; lodicules 0 . 144. DINOCHLOA. Spikelets bractcate, crowded in unilateral spikes, rachilla not produced; fruit very large, fleshy . 145. MELOCANNA. Spikelets large, capitate or subspicate; stamens 6 or more; . 146. OCHLANDRA. fruit very large, pericarp fleshy

EXCLUDED GENUS.

PRIONANTHIUM, Desv. Opusc. 65 t. 4, is a S. African grass, erroneously described as Indian. It was subsequently published by Noes as Prionachne Ecklonic.

Tribe I. Panicess. (See p. 2.)

1. PASPALUM, Linn.

Annual or perennial grasses. Spikelets 1-fld., secund in simple spikes or spikelike branches of a simple panicle or raceme, articulate on the pedicel but not thickened and callous at the base, never awned. Glumes 3 (homologous of II III and IV in Panicum), with rarely a very minute lowest fourth (I of Panicum); I and II subequal, membranous, both sometimes very small or I (at the back of the fl gl.) absent; II. epaleate; III more coriaceous, paleate, bisexual. Stamens 3. Styles 2, free. Grain free within the hardened glume.—Species perhaps about 160, natives of all warm regions.

As above defined, Paspalum includes the Digitaria section of Panicum, which appears to me to be artificially placed in the latter genus, because of the occasional presence of a very minute scale-like glume at the base of what is the 3rd gl. of Panicum (that opposite the fig.). This minute glume which is present or absent even in the same species, is nerveless and never embraces that above it, as the lowest gl. slways does in Panicum proper. One Indian species alone of Panicum (P. subeglume) has only 3 glumes, but its decompound panicle and the form of its spikelets and its affinities are with Panicum.

* Spikelets orbicular or broadly oblong, ovate-oblong in P. distichum.

1. P. scrobiculatum, Linn. Mant. i. 29; spikelets about as broad as the flat rachis $\frac{1}{12} - \frac{1}{6}$ in. diam. 2-4-ranked plano-convex or hemispheric, gl. I 3-nerved, II 5-nerved. Fluegge Monogr. Gram. 86 (Paspalus); Trin. Diss. ii. 122, Gram. Panic. 56, Sp. Gram. Ic. t. 143; Kunth Enum. Pl. i. 53; Steud. Syn. Gram. 21; Roxb. Fl. Ind. i. 278; Grah. Cat. Bomb. Pl. 234; Dalz. & Gibs. Bomb. Fl. Suppl. 97; Thw. Enum. Pl. Zeyl. 357; Trim. Cat. Pl. Ceyl. 104; tichis. Cat. Panjab Pl. 104; Wall. Cat. n. 8753; Wight Cat. n. 1601; Duthie Field and Gard. Crops, 8 t. 27; Grasses N.W. Ind. 1; Indig. Fodd. Grass. t. 1; Fodd. Grass. N. Ind. 1; Mig. Fl. Ind. Bat. 111, 430; Benth. Fl. Hongk. 408, Fl.

Austral. vii. 460. P. alternans, Steud. l. c. 26. P. auriculutum & cartilagineum, Presl Rel. Haenk. i. 217, 216. P. P. bifarium, Edgew. in Journ. As. Soc. Beng. xxi. (1853) 178. P. coloratum, Rich. ex Doell in Mart. Fl. Bras. ii. II. 78. P. Commersoni, Lamk. Illustr. i. 175. P. coromandelianum, Lamk. l. c.; Kunth l. c. 55; Steud. l. c. 32. P. dissectum, Linn. Syst. ii. 86. P. dimidiatum, Linn. Syst. Ed. x. 855. P. firmum, Trin. Gram. Panic. 105, Sp. Gram. Ic. t. 125; Kunth l. c. 60. P. flexuosum, Klein ex Presl l. c. 215; Kunth l. c. 54; Mig. Fl. Ind. Bat. iii. 432. P. frumentaceum, Rottb. ex Roem. & Sch. Syst. ii. 296; Koen. ex Trin. Gram. Panic. 57; Kunth l. c. 53. P. hirsutum, Retz. Obs. ii. 7; Kunth l. c. 33; Mig. l. c. 433. P. Houttuynii, H. C. Hall ex de Vriese in Pl. Ind. Bat. Reinw. 113. P. Kora, Willd. Sp. Pl. i. 332; Host Gram. Austr. t. 74; Beauv. Fl. Owar. ii. 5, t. 61; Roxb. l. c.; Grah. l. c.; Duthie Indig. Fodd. Grass. t. 2. P. longifolium, Roxb. l. c. 280; Trin. Sp. Gram. Ic. t. 138; Wight Cat. n. 1602, Herb. n. 1600. P. mauritanicum, Nees ex Steud. l.c. 26. P. metabolon, P. Metzii, and P. mollipilum, Steud. l.c. 19, 21, 29. P. orbiculare, Forst. Prodr. 7; Fluegge l. c. 88. P. polystachyum and P. pubescens, Br. Prodr. 188; Kunth l. c. 54, 55. P. puberulum, Roem. & Sch. Syst. ii. 316 (Paspalus). P. sumatrense, Roth Nov. Sp. 35; Kunth l. c. 55. P. Thunbergii, Kunth ex Steud. l. c. 28; Franch. & Sav En. Pl. Jap. 159. P. venustum, Forst. f. ex Roem. & Sch. l. c. 297. P. Zollingeri, Steud. l. c. 28. Panicum dissectum, Linn. Sp. Pl. 57.—Paspalum, Wall. Cat. n. 8754. -Rheede Hort, Mal. xii. t. 84.-Sloane Hist. Jam. i. t. 69, f. 2.

Throughout hotter INDIA (wild or cultivated), from the Panjab eastwards and southwards to Singapore and Ceylon.—DISTRIB. All warm countries.

Annual, erect or base very shortly decumbent, 1-6 ft. high, leafy, glabrous, rarely hairy. Leaves acuminate; ligule short, thembranous. Peduncle rather slender. Spikes 2-8, 1-3 in. long, alternate, erect or spreading; rachis 12-10 in. broad, margins ciliate or serrulate. Spikelets in 2, rarely 3-4 rows, imbricate, glabrous or sparsely pubescent, sometimes geminate on a common pedicel; gl. I convex; II flat with two submarginal strong nerves, along the inner margins of which the gl. is sometimes marked with shallow transverse pits (whence the specific name); gl. III. with inflexed auricled margins.—I find it impossible to classify the large series of specimens of this variable plant under available varieties. Roxburgh regarded the Indian forms as 3 species, scrobiculatum, Kora, and longifolium. Between the first two of these he gives no differential characters, beyond that of scrobiculatum having erect stems 2 it. high and being a cultivated form, whereas Kora is indigenous, growing on the banks of watercourses and attaining 8 ft. (? error for 3 ft., as in the description that follows) and has the stem decumbent at the base. P. longifolium he separates by the creeping stems, geminate terminal spikes and pitted seeds, but as Trinius describes the pitting is microscopic (as in other forms of the species). Having regard to the specimens before me, I recognize with more or less confidence (1) a form with larger dorsally tumid spikelets, which I assume to be the cultivated form (including orbiculare, frumentacum, Kora, coromandelianum, and hirsutum); its gl. II is either pitted or not; and (2) a form with rather smaller spikelets, often in 3-4 rows, and gl. II never pitted, to which I refer longifolium, Zollingeri, and dissectum (which latter is the earliest name (under Panicum) of the species). It abounds all over India, and is the only form of which I have seen Malayan specimens. Besides the synonyms adduced above, as to which I am pretty well assured, there may be perhaps many more to be added.

2. P. conjugatum, Berg. in Act. Helvet. vii. (1772) 129, t. 8; spikes 2 terminal or subterminal very slender, spikelets $_{1}^{+}$ in. subsessile orbicular nearly flat, gl. II hyaline margins villously ciliate. Sw. Fl. Ind. Occ. i. 133; Fluegge Monogr. Gram. 102 (Paspalus); Beauv. Fl. Owar. 56, t. 92, f. 2; Trin. Panic. Gen. 54, Sp. Grum. Ic. t. 102; Kunth Revis. Gram. 25, Enum. Pl. i. 51; Trim. Cat. Ceyl. Pl. 104. P. bicrurulum et

bicrurum, Saltzm. ex Doell in Mart. Fl. Bras. ii. II. 55. P. ciliatifolium, Trin. in Mem. Acad. Petereb. Ser. vi. iii. II. (1835), 340. P. cilistum, Lam. Illustr. i. 175. P. dolichopus, Trin. ex Steud. Nom. ed. 2, ii. 271. P. eriophorum, Willd. ex Nees Agrost. Bras. 56. P. hirsutum, Poir. Encycl v. 28. P. longissimum, Hochst. ex Steud. Syn. Gram. 19. P. nutans, Lam. Illustr. i. 175. P. Renggeri, Steud. l.c. 17. P. protensum, Trin. Gram. Panic. 108. P. pubescens, Muhlb. ex Willd. Enum. Hort. Berol. 89. P. supinum, Bosc ex Poir. Encycl. v. 29. P. tenue, Gærtn. Fruct. ii. 2, t. 80. Digitaria conjugata, Schult. Mant. ii. 262.—Paspalus, Wall. Cat. n. 8756.

CACHAR, Keenan. Penang, Curtis, &c. Singapore, King. Ceylon, Thwaites ("introd. from W. Indies.")—Distrib. Trop. and subtrop. regions.

Annual. Stems 1-2 ft., creeping and branching below. Leaves 4-6 by 1 in., or less, margins of sheath above, and mouth ciliate. Peduncle very slender. Spikes 3-7 in., usually geminate and divergent, rachis glabrous. Spikelets imbricate, very palc, plano-convex; glumes with marginal, villous nerves, and an obsolete median; III coriaceous, apiculate, white.—A very elegant grass.

3. P. compactum, Roth Nov. Sp. 36; dwarf, hairy all over, spikes forming a pyramidal raceme, rachis slender triquetrous, spikelets 10 in. hemispheric. Kunth Enum. Pl. i. 61; Steud. Syn. Gram. 31. P. costatum, Hochst. in Herb. Hohenack. n. 635. P. miliaria, C. Muell. in Bot. Zeit. xix. (1861), 325. P. porrigens, Arn. in Herb. Wight. Panicum Canara, Steud. l. c. 58. Pan. imperfectum, Roxb. ex Kunth l. c.

KHASIA HILLS, in wet places, alt. 3-5500 ft., Griffith, &c. RAJPUTANA; Mt. Aboo, Duthie. The CONCAN and CANABA, Jacquemont, &c. NILGHIBI HILLS, Lawson.

Stem 6-10 in., decumbent, and branched below; roots stiff, wiry. Leaves 1-2 by 1-1 in., ovate-lanceolate, acuminate, hairy on both surfaces. Raceme 2-4 in.; spikes many, upper gradually shorter; sxils usually ciliate. Spikelets rather turgid, close-set, but not imbricate, pendulous by short pedicels; gl. I orbicular, obscurely 3-nerved; II narrower, margins broadly hyaline; III plano-convex, white, coriaceous, tip rounded.

4. P. distichum, Linn. Amen. Acad. v. 391; stem creeping and rooting, leaves narrow distichous, spikes geminate, spikelets & in. ovateoblong, appressed to the rachis, gl. I and II equal acute membranous, III acute. Burm. Fl. Ind. 23; Sw. Obs. 35, t. 2, f. 1; Gærtn. Fruct. ii. 2, t. 80; Kunth Enum. Pl. i. 52; Benth. Fl. Austral. vii. 460; Baker Fl. Maurit. 431. P. brachiatum, Trin. ex Nees Agrost. Bras. 62. P. depressum, Steud. Syn. Gram. 20. P. didactylum, Saltzm. ex Steud. l.c. P. digitaria, Poir. Encycl. Suppl. iv. 316. P. distachyon, Willd. ex Doell in Mart. Fl. Bras. ii. II. 73. P. Fernandesianum, Colla in Mem. Acad. Turin. xxxix. (1836), 27. P. fissifolium, Nees ex Doell l. c. 104. P. furcatum, Fluegge Gram. Monogr. 114 (Paspalus). P. geniculatum, Heyne in Herb. Rottl. P. Kleinianum, Presl Rel. Hænk. i. 209; Steud. l.c. 19. P. Kora, Forst. ex Spreng. Syst. i. 244. P. littorale, Br. Prodr. 188: Trin. Diss. ii. 95, Sp. Gram. Ic. t. 112; Kunth Enum. l.c. 51. P. longiflorum, Retz. Obs. iv. 15, ex Roxb. Fl. Ind. i. 279; Beauv. Fl. Owar. ii. 46, t. 85, f. 2; Grah. Cat. Bomb. Pl. 231. P. maculosum, Trin. Gen. Panic. 98, Sp. Gram. Ic. t. 113. P. Michauxianum, Kunth Revis. Gram. i. 25. P. notatum, Fluegge l. c. 106. P. obtusatum, Nees ex Doell, l. c. 103. P. obtusifolium, Trin. Sp. Gram. Ic. t. 115. P. platycaule, Willd. ex Steud. Nom. ed. 2, ii. 272. P. repens, Ic. Roxh. n. 779. ined. P. reptans, Poir. en Doell l.c. 75. P. serpentinum, Hochst. ex Steud. l.c. 22. P. tristachyum, Leconte in Journ. Phys. xii. (1820), 285. P. vaginatum, Sw. Prodr. Veg. Ind. Occ. 21; Fluegge l. c. 108 (Paspalus); Beauv. l. c. ii. 53, t. 92; H. B.

& K. Nov. Gen. & Sp. i. 91; Trin. Diss. ii. 94, Panic. Gen. 53, Sp. Gram. Ic. t. 120; Kunth Enum. 52; Steud. l. c. 20. Panicum polyrhizum, Presl. c. i. 296. Pan. vaginatum, Gren. & Godr. Fl. Fr. iii. 462.—Paspalus, Wall. Cat. n. 8757?—Rheede Hort. Mal. xii. t. 44.

N. W. India, Duthie. Sunderbunds, Romburgh, J. D. H. & T. T. Malabab, Rheede. Carnatic, Heyne. Malacca, Griffith. Andaman Islds., Prain.—Distrib. warm countries.

Stems 1-6 in., erect or inclined from the long creeping base, usually stout, compressed below. Leaves 2-4 in., strict, flat or involute, glabrous or sparsely hairy towards the flattened sheath. Spikes close together, L-1\(\frac{1}{2}\) in., rachis narrower than the 2-serists spikelets. Glumes faintly nerved.—Apparently a rarer plant in India than in most tropical countries. Audaman Isld. specimens have a stout, woody, creeping stem, with thickened nodes, and very short, erect flowering branches, with distictious, subulate, spreading leaves, and spikes partially exserted from the uppermost sheath.

- ** Spikelets ovoid, ellipsoid, or lanceolate.
- † Spikelets $\frac{1}{10}$ in. long, with often a minute scale-like gl. at the base of gl. II. (DIGITABIA, Auct.).
- P. sanguinale, Lamk. Illustr. i. 176; spikes few or many, spikelets $\frac{1}{16}$ in. oblong or lanceolate acute or acuminate, gl. I.= $\frac{2}{3}$ III or shorter or 0, II 5-nerved with or without a minute basal gl., III and its palea oblong-lanceolate acuminate. D.C. Bot. Gall. iii. 16. P. segyptiacum, Poir. Encycl. Suppl. iv. 314. P. bicorne, Lam. l. c. 176; Poir. Encycl. v. 29, Suppl. 306. P. blepharophorum, Roem. & Sch. Syst. ii. 292. P. ciliare, DC. Fl. Fr. Suppl. 250. P. consanguineum, Kunth Enum. Pl. i. 46. P. corymbosum, Kunth Enum. 48; Revis. Gram. i. 28. P. distans, Nees ex Trin. Gram. Panic. 83. P. filiformo, Steud. Nom. ed. i. 586. P. inæquale, Link. Enum. Hort. Berol. i. 103. P. oxyanthum, Steud. Syn. Gram. 27. P. reimarioides, Brongn. Bot. Voy. Coquillo, t. 20. Pauicum sanguinale, Linn. Sp. Pl. 57; Schreb. Beschr. Graes. t. 16; Fl. Dan. t. 388; Host Gram. Austr. ii. t. 17; Lomk. Encycl. Bot. t. 849; Knapp Gram. Britt. t. 12; Trin. Sp. Gram. Ic. t. 93, 94, 144; Thw. Enum. Pl. Zeyl. 358; Trim. Cat. Ceyl. Pl. 104; Aitchie. Cat. Panjab. Pl. 161; Duthie Indig. Fodd. Grass. t. 8, Grass. N.W. Ind. 2; Benth. Fl. Hongk. 410, Fl. Austral. vii. 469; Baker Fl. Maurit. 435: Boiss. Fl. Orient. v. 433. Pan. agyptiacum, Retz. Obs. iii. 8; Roxb. Fl. Ind. i. 29:1; Dalz. & Gibs. Bomb. Fl. 291; Griff. Notul. iv. 17, Ic. Pl. Aisat. t. 139, f. 131. Pan. adpressum, Willd. in Ges. Naturf. neue Schrift. iv. (1803), 193; Kunth Enum. Pl i. 84. Pan. bicorne and biforme, Kunth Revis. Gram. i. 33; Enum i. 83, 84. Pan. ciliare, Retz. Obs. iv. 16; Kunth Enum. i. 82; Host Gram. Austr. iv. t. 15; Br. Prodr. i. 192; Roxb. Fl. Ind. i. 290; Dalz. & Gibs. l. c. 290; Thw. Enum. 358; Griff. l. l. c. c. 32, t. 139, f. 65; Duthie Indign. Fodd. Grass. t. 9; Pan. commutatum, Nees in Linnæa, vii. (1832), 274; Benth. Fl. Hongk. 410. ? Pan. corymbosum, Roxb. l. c. 292. Pan. didactylum, Kunth l. l. c. c. 33, 84; Baker Fl. Maurit. 435. Pan. eriogonum, Schrad. Pl. Hort. Goett. fasc. i. ex Schult. Mant. ii. 253; Kunth l. l. c. c. 33, 82. Pan. filiforme, Jacq. Obs. iii. 18, t. 70. Pan. horizontale, Mey. Prim. Fl. Esseq. 54; Kunth Enum. i. 81. Pan. Linkianum. Kunth Revis. Gram. i. 33. Pan. pabulare, Aitch. & Hemel. in Journ. Linn. Soc. xix. (1882), 190; Boiss. Fl. Orient. v. 434. Pan. pruriens, Fisch. ex Trin. Diss. ii. 17, Gen. Pan. ii. 77, Sp. Gram. Ic. t. 92; Kunth Enum. i. 83. Pan. radicosum, Prest Rel. Hænk. i. 297; Kunth l. c. 81. Pan. Rottleri, Kunth Revis. Gram. i. 33; Enum. l. c. 82. Digitaria mgyptiaca & biformis, Willd. Enum. Hort. Berol. 92, 93. D.

australis, Willd. ex Trin. in Mem. Acad. Petersb. Ser. vi. iii. (1835), II. 201. D. ciliaris, Pers. Syn. i. 85: Ledeb. Fl. Ross. iv. 468; T. Nees Gen. Fl. Germ. Monoc. n. 16; Reichb. Ic. Fl. Germ. i. t. 27; Miq. Fl. Ind. Bat. iii. 436; Ledeb. Fl. Ross. iv. 468. D. commutata, Schult. Mant. ii. 262. D. didactyla, Willd. l. c. 91. D. distachya, Bojer Hort. Maurit. 363; Lamk. Illustr. t. 43, f. 2. D. eriantha, Steud. in Flora, xii. (1829), 468. D. eriogona Link Enum. Hort. Berol. i. 227, in Flora, l. c. D. horizontalis, Willd. l. c. 92. D. linearis, Pers. l. c. D. marginata, Link. l. c. 102. D. nervosa, Roem. & Sch. Syst. ii. 473. D. nodosa. Webb & Berth. Phyt. Canuv. iii. III. 384, t. 246. D. pruriens, Büse in Pl. Jungh. 379; Miq. l. c. 436. D. radicosa, Miq. l. c. 437. D. repens, Willd. ex Kunth l. c. 81. D. Rottleri, Roem. & Sch. l. c. 471. D. sanguinea, Scop. Fl. Carniol. 72; Weber in Willd., Prim. Fl. Holsat. 6. D. sanguinalis, Scop. l. c. ed. 2, i. 52; Reichb. l. c. t. 87; Parlat. Fl. Ital. i. 125 (with full citations). D sanguinoleuta, Edgew. ex Aitch. Cat. Panjab. Pl. 161. D. setigera, Roth ex Roem. & Sch. l. c. 474. Dactylon sanguinale, Vill. Delph. ii. 69. Phalaris velutina, Forsk. Fl. Æg. Arab. 17. Syntherisma vulgare, Schrad. Fl. Germ. i. 161. S. ciliare, Schrad. l. c. t. 3, f. 7. PAxonopus corymbosus, Schult. Mant. ii. 77.

Throughout INDIA, in dry and moist situations, ascending the Himalaya to

6:00 ft. (cult. in the Khasia Hills). - DISTRIB. all warm countries.

Annual or perennial. Stem 2 in. to 3 ft., erect or ascending from a creeping. branching base. Leaves very variable, 1-12 by 1-1 in.; sheaths rarely hairy, except Spikes 1-3 in., rarely more, usually strict; rachis at or near the mouth. trigonous or flattened, stout or slender, or winged, wings green, rarely more than twice the breadth of the midrib, margins smooth or ciliolate. Spikelets geminate. loosely or closely imbricate, rarely scattered; gls. often silkily hairy along the margins and nerves. The hairs in the upper spikelet of var. ciliars sometimes abnormally developed into a long beard or brush of curved cilia; there is every gradation between the most densely bearded and almost glabrous spikelets (see also P. heteranthum); gl. I (at the back of the fig. gl.) variously developed from an obscure tuft of hairs to nearly as long but not quite so broad as III, 3-5-nerved, usually silky; II 5-nerved, lateral nerves marginal, rarely all close together, and with the interspaces thickened, when the gl. appears many-nerved; III. lanceolate or oblonglanceclate, smooth.-The above definition embraces a wide range of forms, which I believe are all referable to P. sanguinals. The species is one of the very commonest plants in India, and in all warm countries. A form (var. commutatum) is cultivated in the Khasia Hills, of which fact I find no notice in any work on Indian food grains. The following attempt to classify the Indian forms is founded on a close study of an enormous collection of specimens from all parts of Iudia, amongst which those of Mr. C. B. Clarke are especially noteworthy. As to the result, I am satisfied that no two botanists working independently over the same materials would arrive at the same, or agree in any other; and that the results of working over a large collection from any other country would again be different. I have made no attempt to deal with the American forms, at which I have only glanced; they suggest no modification of my arrangement of the Indian.

Var. 1. oruciatum; spikes severul 2-3 in. usually horizontal, rachis slender trigonous narrowly or rather broadly winged, spikelets ovate-oblong acute or cuspidately acuminate rather loosely imbricate quite or nearly glabrous purple or green, gl. II half as long as III ovate-oblong obtuse 3-nerved, III ovoid or obovoid rather turgid cuspidately acuminate. Panicum cruciatum, Ness ss Steud. Syn. Gram. 39. P. sanguiusle, Wall. Cat. n. 8681. K.P.—Panicum, Wall. Cat. n. 8728. Digitaria cruciata, Ness ss Herb. Strach. v. Winterb. No. 3.—Himslayan region, alt. 5-8500 ft., from Iskardo and Kashmir to Sikkim and the Munnipore

hills.—This form appears to me to be most nearly allied of any in habit and

spikelets to Pasp. ambiguum.

Var. 2. commutatum; usually tall, stout or slender, tufted or prostrate and widely creeping below, leaves rather long, spikes few or many (up to 20) 3-6 in. long fastigiately or subcorymbosely arranged, lower often whorled or fascicled, rachis slender narrowly winged, spikelets broad rather crowded shortly pedicelled. gl. I lanceolate rather shorter and narrower than III, II with the lateral nerves glabrous or pubescent, and with usually a minute gl. at the base, III lanceolate acuminate. Pan. commutatum, Nees in Herb. Royle; Digit. ciliaris? Wight Cat. n. 1609, Herb. n. 3033; Pasp. paniculatum, Herb. Jacquemont., Pan. sanguinale, Herb. Strach. & Wint. n. 1. P. ciliare, Thwaites (C.P. n. 861, 862).—Panicum, Wall. Cat. n. 8681 Á (racemosum, Herb. Heyne) B.C. (filiforme, Herb. Heyne) E.F.H.I.M.N.O.P.; P. filiforme and tenuifolium, Heyne in Herb. Rottl. l.c. ? P. corymbosum, Roxb. l.c. P. filiforme, Roxb. Ic. ined .- Throughout India, especially in the hills, ascending to 7000 ft. along the Himalaya, and to 10,000 in Western Tibet. —(Asia, Africa.) This is the typical S. African Pan. commutatum, Nees, but I am doubtful as to its being the P. corymbosum, Roxburgh, which is described as found "only in valleys of the Circars, growing to a great size in standing waters, with culms creeping, or floating with their erect extremities above water; when found on dry ground it is in general 1-4 ft. high, Roxb." A specimen of var. commutatum in Herb. Kew is labelled Pan. filiforme in Roxburgh's handwriting, but probably the ticket is misplaced.

Var. 3, cilia e; usually tall, slender, spikes few (2-6) 3-6 in. long, rachis slender narrowly winged, gl. I long or short ciliate, gl. II of lower spikelet, with glabrous or sparingly villous, marginal nerves, of upper spikelet with the marginal nerves densely villous or bearded with soft spreading hairs that are much broader than the gl. and often hooked at their tips. P. ciliare, Retz.; Wall. Cat. n. 8682).—Digitaria ciliaris, var. quadristachya, Wight Herb. n. 3034. D. commutata, Herb. Strach. & Winterb. n. 2. The bearded glumes may occur in other of the varieties here enumerated (as in var. debile from the Nicobars) as it is only when the spikelet is well advanced that the beard appears to be fully developed.—

Very common.

Var. 4, pabulare; perennial, tall, strict, erect, spikes very many 3-7 in., rachis slender trigonous, spikelets rather distant narrowly lanceolate acuminate silkily villous white, gl. I as long as III 3-nerved, II with approximate nerves and usually a minute accessory gl. at its base, III very narrow acuminate. Pan. pabulare, Aitchis. & Hemst. l. c.—The lower hills of the Panjab, Affghanistan, and Beluchistan, Jacquemont. &c.

Var. 5, pruriens; erect, glabrous, or sheaths hirsute, spikes many 3-5 in., rachis slender trigonous, spikelets narrowly lanceolate acuminate nearly glabrous, gl. I nearly as long as III, II very narrow, with approximate nerves and a minute basal gl., III very narrow acuminate. Pan. pruriens, Fisch. L. c.—Bengal, Wallich (Cat. n. 8681, L.). Burma, Grißith, Malacca, Cuming (n. 2397), Maingay (Kew Distrib.

1729), (Java. &c.).—Hardly different from var. extensum.

Var. 6, Griffithii; spikes several 2-4 in long very slender often drooping, rachis filiform trigonous, spikelets linear-lanceolate solitary or in distant pairs glabrous or ciliate, pedicel of upper often longer than the spikelets, gl. I nearly as long as III narrow 5-nerved ciliate, II with ciliate lateral nerves, III narrow acuminate. Panicum Griffithii, Arn. in Herb. Wight. Pan. corymbosum, Thw. Herb. (C.P. 3800). Pan. dissitifiorum, Nees & Arn. in Wight Cat. n. 2341 (not of Stewl.). Pan. sanguinale, Wall. Cat. n. 8681, D.G. and 8748. Pan. Rottleri, Kunth (nervosum, Willd.) Herb. Wight. n. 1610 (not of hunth Revis. Gram.) — Panicum? Wall. Cat. n. 8748.—Madrus, Burma, Ceylon.—This resembles Pan. commutatum, but has filiform spikes of scattered, longer pedicelled spikelets. It occurs in S. Africa, and no doubt elsewhere. There is no locality on Arnott's ticket of Griffithii, which is doubtless from the Madras peninsula, he has added to it, Wight Cat. n. 2057, which is Pan. horizontale, var. macasthrum, Nees, of which I have seen no specimen.

Var. 7, extensum; stout or slender, sheaths glabrous or hirsute, spikes few or

many, rachis narrowly winged, spikelets oblong-lanceolate acuminate more or less ciliate, gl. I half the length of III or less or minute ciliate. Pan. extensum, Nees & Arn. in Wight Cat. n. 2340 (which is Pan. dilatatum, Stend. l. c. 39). Pan. nervosum, Rottler in Ges. Naturf. Fr. Neue Schrift. iv. (1803), 194 (not Roxb). P. filiforme, Herb. Roxb.—Common. This resembles a slender form of var. commutatum, with reduced gl. I.

Var. 8, debile; small or dwarf, 4-10 in. high, much branched from the tufted or prostrate or creeping base, glabrous or hairy, spikes 2-5 1-3 in. digitate or nearly so slender, wings of rachis narrower than the midrib, spikelets lanceolate acuminate, gl. I. from minute to nearly as long as III ciliate, II 5-nerved glabrous or ciliate. Pasp. debile, Poir. Encycl. v. 34 (excl. syn.); Roem. & Sch. Syst. ii. 303. Pan. debile, Desf. Fl. Atlant. i. 59; Bertol. Fl. Ital. ii. 778; Trin. Panic. Gen. 117. Digitaria debilis, Willd. Enum. Hort. Berol. i. 91; Parlat. Fl. Ital. i. 127.—Plains and low hills, from Bengal to Burms, Malacca, and the Andaman and Nicobar Islds. Ceylon (O.P. n. 856, 857).—Wall. Cat. 8683 (spikes longer, more slender). A very common dwarf form in low ground or poor soil, passing into var. commutatum, and the following. The specimens with gl. I nearly as long as III are typical Pah. debile of the Mediteranean region, but there is a gradual shortening of that gl. to a mere fimbriate scale. A minute accessory gl. at base of gl. II is present or absent. The Nicobar specimens have the bearded upper spikelet of var. ciliare.

Var. 9, Rottleri, characters of var. debile, but rachis of spike stouter broader green, the wings two or three times broader than the midrib, glumes broader as in commutatum, of which it is a dwarf form.—It resembles Host's and Reichenbach's figures of ciliare. Pan. Rottleri? and P. ciliare, Wight Herb. n. 3032 (not Cat.

1610), and 3033.—Common in the plains of India.

7. P. heteranthum, Hook. f.; stem stout, spikes many 6-12 in., rachis very stout rigid trigonous, spikelets in. very distant, upper long-pedicelled lanceolate, gls. rigid finely acuminate, I and II longer than III, of lower spikelet glabrous of upper villous. Panicum barbatum, Kunth Revis. Gram. i. 33; Enum. Pl. i. 84; Steud. Syn. Gram. 43. Benth. Fl. Hongk. 410. Pan. elytroblepharum, Steud. in Zoll. Syst. Verz. 54. Pan. eminens, Steud. l. c. 43. Pan. heteranthum, Nees et Meyen in Nov. Act. Nat. Cur. xix. Suppl. i. (1843), 174; Steud. l. c. 43. Digitaria barbata, Willd. Enum. Hort. Berol. 91. D. elytroblephara, Miq. Fl. Ind. Bat. iii. 439.

MALAY PENINSULA; Pahang, Ridley .- DISTRIB. Java, China.

A very remarkable species, of which I have seen only one Malayan specimen. The spikes appear to be irregularly produced, being leafy where their bases meet; rachis strict or flexuous, margined with green. Lower spikelet of each pair with very strongly nerved, acuminate, glabrous gls., and no small basal gl., upper with a rigid pedicel and minute, orbicular, naked, basal gl., its other gls. densely villous; gls. of the upper spikelet at length spreading, hairs very long, with hooked tips.—Perhaps only an extreme form of P. saguinale, var. ctitare. I have seen no authentic specimen of P. elytroblepharum, but Miquel's description of it accords with the Malayan plant, and he cites P. eminens as a synonym.

8. P. pennatum, Hook. f.; spikes 8-10 radiating elongate filiform ciliate, spikelets [-] in. solitary or binate narrowly lanceolate subsilky, gl. I as long as III 3-5-nerved, II with or without a minute basal one nerves, 5 equidistant, III narrowly elliptic-lanceolate acuminate. Panicum pennatum, Hochst. in Flora, xxxviii. (1854), 197.

SIND; at Kurrachee. Stocks. Beluchistan, Frere.—Distrib. Arab., Abyssin. Stem 1-2 ft., branching from the suberect or prostrate base, slender. Leaves 1-6 by \(\frac{1}{2} \) in., glabrous, or sheaths and sometimes margins and both surfaces heiry, ciliate with long hairs towards the base; ligule rather long, membranous. Spike. 3-6 in.; rachis almost capillary, trigonous, very rarely branched, cilia very long. Spikelets erect, pedicel of the upper almost as long as the gls.

9. P. ambiguum, DC. Fl. Franc. iii. 16; stems diffusely decumbent or ascending, spikes 2-4 subdigitate spreading, rachis narrowly winged, pedicels nearly glabreus, spikelets imbricate χ_2^{1} in. elliptic subacute silkily pubescent with slender hairs or glabrate, gl. 1 nearly = III, II 5-nerved, III ovate-oblong acute. Panicum ambiguum, Lapeyr. Hist. Abr. Pl. Pyr. 31; Fig. & Not. in Act. Tor. (1854) 336, t. 11; Sang. in Atti Linc. Ser. I. xviii. (1865) 219, t. 421. Pan. arenarium, Bieb. Fl. Taur. Cauc. i. 52. Pan. distichum, Gaudin ex Steud. Nom. Ed. II, ii. 255. Pan. glabrum, Gaudin. Agrost. Helvet. i. 22; Fl. Helvet. i. 155; Trin. Diss. ii. 83; Sp. Gram. Ic. t. 149; Kunth Enum. Pl. i. 83; Boiss. Fl. Orient. v. 433; Steud. Syn. Gram. 1. Pan. humifusum, Kunth Revis. Gram. i. 33. Pan. Isshæmum, Schreb. ex Schweigg. Spec. Fl. Erlang. 16. Pan. lineare, Krock Fl. Siles. i. 95. Pan. sanguinale, Pollich. Hist. Pl. Palat. i. 57. Digitaria filiformis, Roel. Descr. Gram. 26; Reichb. Ic. Fl. Germ. t. 27. D. glabra, Beauv. Agrost. 160; Ledeb. Fl. Ross. iv. 468; Parlat. Fl. Ital. i. 127. D. humifuss, Pers. Syn. i. 85; Engl. Bot. t. 2613. D. linearis, Rostaf. in Verh. Bot. Zool. Ges. Wien. xxii. (1872) 99. D. procumbers, Hort. ex Steud. Nom. Ed. II, i. 508. Syntherisma glabrum, Schrad. Fl. Germ. i. 163.

WESTERN HIMALAYA, alt. 5-10,000 ft.; Kashmir, Stewart; Simla, Thomson.

WESTERN TIBET, alt. 8-10,000 ft., Thomson .- DISTRIB. Europe, N. Asia.

Stems 6-12 in., usually diffusely spreading, rarely erect. Leaves linear-lanceolate, scute, glabrous; mouth of sheath hairy. Spikes 2-6, 1-2 in. long, subcrect or divaricate, green or reddish. Spikelets variable in hairiness; the hairs often with slightly clavate tips; gl. II with rarely a minute one at the base; III quite smooth.—Very similar to var. cruciatum of P. sanguinale, but has smaller broader not acuminate spikelets, and gl. IV is never acuminate. Even more like P. ternatum, which is best distinguished by the bristle-like hairs on the pedicel, and short clavate ones on the outer gls.

10. P. ternatum, Hook. f.; stems erect or decumbent below, spikes 2-3 subdigitate erect or spreading, rachis narrowly winged ciliolate, spikelets $\frac{1}{12} - \frac{1}{10}$ in. geminate imbricate elliptic subacute villous with clavellate hairs, pedicels setulose, gl. I nearly = III or shorter, II 5-nerved nerves equidistant, III ovate-oblong acute. P. humifusum, Heyne ex Wull. Cat. 8755. Panicum ternatum, Hochst. in Flora, xxiv. (1841) i. Intell. 19; Steud. Syn. Gram. 40. Cynodon ternatum, A. Rich. Tent. Fl. Abyss. ii. 405.

WESTERN GHATS; Bababudan Hills, Heyne; Belgaum, Ritchie. KHASIA HILLS;

Pomrang, alt. 4-5000 ft., J. D. H. & T. T.- Distrib. Abyssinia.

Habit of P. ambiguum. Leaves 2-5 in, linear-lanceolate or linear; sheath glabrous or with a few hairs, mouth ciliate; ligule short, membranous, truncate. Spikes 2-3 in., silvery-white. Spikelets pale, pedicels short, hispid with stiff hairs, the upper hairs half as long as the spikelet; gl. I and II with the hairs forming a dense fringe along the margins.—The Belgaum and Khasian specimens are tall and long leaved; the Bababudan ones very short. Said by Schimper to be a pest in cultivated land in Abyssinia. It so closely resembles P. ambiguum, that without microscopical examination of the hairs of the spikelets it is very difficult to distinguish it from that species. A Ceylon plant, from Thwaites (C.P. 2573), with larger spikelets than P. longiforum (to which I doubtfully refer it), cannot be distinguished from P. ternatum except by the structure of the hairs of the spikelet.

†† Spikelets 34-14 in., with no minute gl. at base of II.

11? P. longiflorum, Retz. Obe. iv. 15 (non Tria); stems procumbent below rafely erect from the base, series to meny introductional erect or ASIATIC SUCKETTO OF BEAUTICE OF BE

spreading, rachis filiform, spikelets 1/3-1/4 in elliptic-oblong silky with slender (not clavellate) crisped hairs, pedicels glabrous or nearly so, gl. I and II subequal or I shorter or obsolete, II 5-nerved, IMI ovate acuminate. Wall. Cat. n. 87:1, C.; Wight Cat. n. 1603; Baker Fl. Maurit. 431. P. Enum. Pl. Zeyl. 358). P. brevifolium, Fluegge Gram. Monog. 150 (excl. Syn.); Kunth Enum. Pl. i 48; Wight Cat. n. 1603, 1604; Steud. Syn. Gram. 41; Benth. Fl. Hongk. 408, Fl. Austral. vii. 461; Franch. & Sav. En. Pl. Jap. ii. 159. P. chinense, Nees in Hook. & Arn. Bot. Beech. Voy. 231; Steud. l. c. P. filiculme, Nees ex Thw. l. c.; Wight Cat. n. 1604; Trim. Cat. Ceyl. Pl. 104; Franch. & Sav. l. c.; Duthie Grass. N. W. Ind. 1. P. granulare, Trin. in Spreng. N. Entdeck ii. 47; Kunth l. c. 50. P. minutiflorum, Steud. l. c. 17; Benth. l. c. P. nematodes, Schult, Mant. ii. 71; Kunth l. c. 65. Panicum argyrotrichum, Anderss. in Peters Reise Mossamb. Bot. 548. Pan. lineare, & Pseudo Duroa, Nees in Herb. Wight, Pan, longiflorum, Gmel, Syst. 158; Wall. Cat. n. 8751 A. Pan. parvulum, Trin. Pan. Gen. 117, in Mem. Acad. Petersb. Ser. vi. iii. II (1835) 305. Pan. propinquum. Br. Prodr. 193. Pan. Pseudo-Duroa. Nees Fl. Afr. Austr. 21; Wight Cat. n. 1608. Pau. tenuiflorum, Br. l. c.; Kunth l. c. 85; Duthie Grass. N.W. Ind. 7, Fodd. Grass. N. Ind. 13. Digitaria linearis, Schult. Mant. ii. 264 (ex Miquel). D. longiflora, Pers. Syn. i. 85. D. Pseudo-Duroa, Mig. Fl. Ind. But. iii. 439. D. Roxburghii, Spreng. Syst. i. 270. D. tenuisiora, Beauv. Agrost. 51. Milium filiforme, Roxb. Fl. Ind. i. 314; Wight Cat. n. 1604, a.b.c. M. radiatum, Herb. Rottl. M. setaceum, Herb. Koen. in Mus. Brit. M. triracemosum, Roxb. Ic. Ined. n. 315. Agrostis lenta, Ait. Hort. Kew, i. 96. A. triracemosa, Herb. Roxb.—Paspalum, Wall. Cat. n. 8751, 8752 B.D.E.

Throughout India, from Kashmir eastwards and southwards to Ceylon (C.P. 860) and Malacca; ascending the Himalaya to 6006 ft.—Distrib. Trop. and subtrop.

regions of the Old World.

Annual or perennial? Stems tufted, 6-18 in., simple or branched below and rooting with ascending branches or prostrate. Leaves very various, 1-11 in long lanceol te and divaricate, or 6-8 in. long, linear erect or spreading; sheath smooth or hairy; ligule short, truncate, membranous. Spikes 1-4 in., subdigitate or alternate, usually silvery-white. Spikelets geminate, a subsessile and pedicelled, pale green or purplish; gl. III pale, or dark brown.-The extreme forms of this species are very dissimilar. the most marked are P. longiflorum, proper (brevifolium, Fluegge), with often prostrate stems spreading from the root or creeping and rooting from 6-12 in, with short lauceolate leaves, and 2-3 divaricate spikes, and P. minutiflorum. Steud. with slender erect stems, narrow linear leaves and many long erect spikes, exactly as P. Royleanum. The hairs on the spikelets seen under the microscope are very slender and as it were crisped or wrinkled, quite unlike those of P. ternatum and Rowleanum. Thwaite's CP. n. 2573 is a puzz'ing plant, tall, with much longer spikelets, approaching those of P. ambiguum. Though in this species and its allies there is no distinct gl. at the base of II, a microscopical rudiment of one may often (always?) be detected.

12. P. Royleanum, Nees ex Thw. Enum. Pl. Zeyl. 358; erect or shortly decumbent below, leaves usually erect, spikes 2-10 erect, rachis filiform, spikelets \(\frac{1}{10} - \frac{1}{10}\) in. oblong, gl. I and II densely orisply white-tomentose with clavellate hairs, pedicel setulose, gl. I = \frac{3}{2} III or shorter or obsolete, II broadly oblong subacute 5-nerved, III oblong subacute quite smooth. Trim. Cat. Pl. Ceyl. 158; Herb. Strach. & Winterb. Pusp. n. 2; Duthie Gruss. N.W. Ind. 1. P. filiculme, Herb. Strach. & Winterb. n. 3

(non Nees). P. trachyanthum, Nees in Herb. Wight. Panicum puberulum, Kunth Revis. Gram. i. 32; Enum. Pl. i. 81; Steud. Syn. Gram. 41. Digitaria puberula, Link Enum. Hort. Berol. i. 223. Milium ovatum, Heyne ex Wall. Cat. n. 8752. Agrostis villosa, Koen. in Herb. Mus. Brit. Zoysia Codia, Ham. in Wall. l. c.—Paspalum, Wall. l. c. n. 8684, 8752, A.C.

Hilly districts of INDIA, from Kashmir eastwards to Munnipore, and southwards

to Ceylon; ascending the Himalaya to 7000 ft .- DISTRIB. Africa trop.

Habit of the tall forms of *P. longiflorum*, almost always erect with long leaves, except in starved specimens; we'l distinguished from that plant (as Dr. Stapf first pointed out to me) by the short clavellate thick walled hairs of the spikeleta, and the usually setulose pedicels, the longer hairs of which are sometimes half as long as the spikelet, as also by the shorter broader gl. III, which is (as in *longiforum*) pale yellowish or dark brown and shining. *Gl.* I is often reduced to a tuft of hairs; II always = III.—This species was referred by Munro to *P. ischnocaulon*, Trin., a grass erroneously attributed to India, by its author in Sp. Gram. lc. t. 126, but corrected to America in the corrigenda at the end of that work. Some specimens have been referred by Munro to *P. concinnum*, Steud. (Syn. Gram 19), a very doubtful species of unknown origin. In the Ceylon specimen, C.P. 85\$, the pedicels are hardly setulose. In African specimens, apparently of this species, they are remarkably developed and longer than the spikelets. Specimens from Poona are tall, 2 ft. high, very robust, and branched from the base. Steudel's *P. Royleanum* is according to his description a very different plant, and judging by his reference of it to Wall. Cat. n. 8700 B. is *Pantcum auritum*.

13. P. pedicellare. Trin. ex Steud. Nom. Ed. II, ii. 272; erect, spikes alternate approximate erect or spreading, spikelets $\frac{1}{2^{1}}$ in. geminate or 3-5-nate, upper of each pair half as long as their pedicels elliptic acute, gls. membranous, I and II subequal 5-nerved, III elliptic-oblong acuminate pale. P. granulare, Trin. in Spreng. Neue Entdeck. ii. 47; Spreng. Syst. i. 244; Kunth Enum. Pl. i. 50; Steud. Syn. Gram. 16. P. pedicellatum, Nees & Arn. in Wight Cat. 2310, & Herb. n. 3027; Duthie Grass. N.W. Ind. 1. Milium capillaceum, Koen. ex Steud. Nom. Ed. II, ii. 145. M. punctatum, Koen. in Herb. Mus. Brit. M. sanguinale, Roxb. Fl. Ind. i. 315 (excl. Syn. Burm.). M. setaceum, Koen. in Herb. Banks.; Jacq. ex Trin. l. c. M. striatum, Herb. Ham. ex Wall. Cat. n. 8747 A.—? Paspalum, No. 3, Griff. Notul. iii. 14 (in part), Ic. Pl. Asiat. t. 146, f. 1.—Panicum, Wall. Cat. n. 8747.

THEOUGHOUT INDIA, in the plains and low hills from the N.W. Provinces to Bengal. NILGHIRI HILLS, alt. 5000 ft., Beddoms. UPPER BURMA, Collett.

Stem 6-18 in., branched from the base. Leaves 2-6 by $\frac{1}{2}$ - $\frac{1}{2}$ in., finely acuminate; ligule short, scarious. Spikes 3-10, 1-4 in., subterminal on the very slender peduncle, spreading; rachis capillary, trigonous; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; gls. slightly hairy.—Munro identifies Griffiths' Pasp. 3 with this; it differs in the flattened rachis, red prostrate stem, and pale red spikelets, which I have never seen in pedicellatums. Roxburgb's excellent drawing (as Milium sanguinale) shows pale spikelets.

14. **P. jubatum**, Griseb. in Goett. Nachr. (1868) 84 (Gesamm. Abhandl. 301); erect. rather stout, leaves long, spikes very many lower whorled, spikelets $\frac{1}{2^{10}}$ in. in scattered pairs pale or dark purple elliptic acute, glanifinely tomentose, I rather shorter than III 3-nerved, II 5-nerved, III elliptic-lauceolate acuminate.

The KHASIA HILLS; in wet places, alt. 5-6000 ft., J. D. H. & T. T., &c. Stem 2-4 ft., shining, interpodes long. Leaves 6-10 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., smooth; sheath very long; ligule short rounded. Spikes 4-7 in., very unequal; rachis slender,

trigonous. Spikelets subsessile; gls. thin, shining.—Pale spikes and spikelets occur on the same plant with the dark coloured.

15. P. Perrottetii, Hook. f.; stem creeping below, spikes in a pyramidal panicle lower often whorled, rachis capillary, spikelets 10 15 in. oblong-lanceolate acute brown, upper of each pair long-pedicelled, gl. I and II subequal many-nerved, III elliptic-lanceolate acuminate. Panicum Wallichiauum, Wight & Arn. in Wight Cat. n. 1607, Herb. 3085; Steud. Syn. Grom. 41; Thw. Enum. Pl. Zeyl. 358; Trim. Uat. Ceyl. Pl. 104. Pan. multibrachiatum, Hochst. ex Steud. l. c. 74. Pan. Perrottetii, Kunth. Revis. Gram. ii. 395, t. 3; Enum. Pl. i. 96. Milium minutiflorum, Trin. Panic, Gen. 33.

NILGHIRI HILLS, Wight, &c., alt. 6000 ft., Lawson. CRYLON, in the Central

Province, Thwaites, - DISTRIB. N. Africa.

Very variable in height, 6-24 in., much branched below. Leaves 1-6 by 1-1 in., glabrous or ciliate; sheaths 1-1; in.; ligule rounded, scarious. Panicle 2-3 in., peduncle filiform. Spikes erecto-patent, lowest 1-1 in., upper gradually smaller; rachis trigonous. Spikelets geminate, lower sessile or pedicelled.—The panicled inflorescence is very different from that of P. pedicellare.

DOUBTFUL SPECIES.

P. GRIFFITHIANUM, C. Mull. in Bot. Zeit. xxix. (1861) 325. "Foot of Khasia Hills, Griffith."—There is no Indian Paspalum that at all resembles the description of this, which, according to its author, is an ally of P. Auitans, Ell., and other American species. There is probably an error as to the habitat and collector.

2. ERIOCHLOA, H. B. & K.

Annual or perennial grasses. Leaves flat. Spikelets secund on the spiciform branches of a raceme or panicle, base thickened and articulate on the thickened top of the short pedicel. Glumes 3, I and II subequal, membranous; III shorter, apiculate, hardened in fruit. Lodicules truncate. Stamens 3, anthers linear. Styles free. Grain oblong, free within the hardened glume.—Species few, tropical.

The thickened base of the spikelet alone distinguishes Eriochloa from Paspalum.

1. B. polystachya, H. B. & K. Nov. Gen. & Sp. i. 95, f. 31; spikes panieled, spikelets; in. long erect ovoid soute, gl. I & II silky or glabrous 3-5-nerved. Lam. Encycl. t. 909; Kunth Enum. Pl. i. 72, Suppl. 53; Trim. Cat. Ceyl. Pl. 104; Duthie, Indig. Fodd. Grass. t. 41, Fodd. Grass, N. Ind. 2. E. annulata, Kunth Rev. Gram. i. 30, Enum. i. 73; Aitchis. Cat. Panjab. Pl. 158; Duthie Grass. N.W. Ind. 2; Benth. Fl. Hongk. 409, Fl. Austral. vii. 463. E. punctata, Ham. Prodr. Fl. Ind. Occ. 5; Kunth Enum. i. 72, Suppl. 54. Miq. Fl. Ind. Bat. iii. 441; Benth. Fl. Austral. vii. 462. E. sundaica, Miq. l. c. Suppl. 606. E. succincta, Kunth l. c. i. 73. Helopus annulatus, Nees in Mart. Fl. Bras. ii. 17; Wight Cat. n. 1605; Wall. Cat. n. 8750. H. lævis, Trin. ex Spreng. Neue Entdeck. ii. 49, fig. 4. H. pilosus, Trin. Fund. Agrost. 104, fig. 4. H. acrotrichus, Steud. Syn. Gram. 100. Paspalum punctatum, Fluegge l. c. 127 (Paspalus); Trin. Sp. Gram. Ic. t. 155. P. annulatum, Fluegge l.c. 133 (Paspalus); Trin. l.c. t. 133. P. succinctum, Trin. Diss. ii. 19; Sp. Gram. Ic. t. 156. Milium Carar & M. Languchinia, Herb. Ham. ex Wall. Cat. n. 8750, F G. M. polystachyum, Spreng. Syst. i. 25 R punctatum, Linn. Amæn. Acad. v. 392, Sp. Pl. 91; Br. Prodr. 188.

orixense, Roxb. Ic. ined. n. 818. M. ramosum, Retz. Obs. vi. 22; Roxb. Fl. Ind. i. 316; Griff. Notul. iii. 15, Ic. Pl. Asiat. t. 139, f. 60. Piptatherum punctatum, Beauv. Agrost. 18, t. 5, f. 1. P. confine, Schult. Mant. ii. 184 (ex Kunth). P. annulatum, Raddi Agrost. Bras. 30. Agrostis punctata, Lamk. Eneycl. i. 58. Œdipachne punctata, Link Enum. Hort. Berol. i. 51.

PLAINS OF INDIA; from the Punjab to Bengal, Burma, Central India, and

southward to Mulacca and CEYLON. - DISTRIB. All hot countries.

Stems 1-5 ft., ascending from a creeping base. Leaves 3-10 by \$-\frac{1}{2}\$ in., glabrous or hairy, ligule very short. Spikes forming a narrow secund compound panicle 2-8 in. long; rachis trigonous and branches pubescent villous or nearly glabrous. Spikelets shortly pedicelled; gl. I and II usually silky, sometimes villous, III much shortest, punctulate, very shortly awned.

3. ISACHNE, Br.

Perennial grasses. Spikelets small or minute, loosely panicled, not or obscurely articulate with the pedicel, subglobose or phovoid, 1-2-fid. Glumes 4, often all separately deciduous from a minute rachilla; I and II subequal, convex, herbaceous, empty; III and IV paleste, equal and both convex, or III larger flatter thinner; III male, rarely 2-sexual; IV articulate and often stipitate on the rachilla, hemispheric, coriaceous, fem. or bisexual. Lodicules very minute. Stamens 3, rarely 4-6. Grain free within the hardened gl. and pale.—Species about 25, tropical and subtropical.

The 2-fid. spikelets not articulate on the pedicel, with usually subequal convex empty gls., and gl. IV being articulate on the rachilla, distinguish Isachne from Panicum. I find great varieties in the persistence of the empty glume on the pedicel. Mr. Bendle informs me that he has seen traces of a fifth glume and pales in I. australis, which favours the claim of the genus to be referred to Poaces; and he has shown me a most minute prolongation of the rachilla at the base of the palea of gl. IV in the same species. Many of the species so run into their allies, that I regard the following limitation of most as open to question. The smooth bispid or bristly empty gls. affords no specific character, nor does the glabrous or pubescent fi. gl.

- * Spikelets $\frac{\tau}{20} \frac{1}{10}$ in long.
- † Glumes I and II longer than IV, cuspidate or acuminate.
- 1. **E. Eunthiana**, Wight & Arn. in Wight Cat. n. 1659; Thw. Enum. Pl. Zeyl. 362; stem 6-10 in. more or less hairy, leaves ovate or ovate-oblong, panicle 2-2½ in., branches few, gl. I and 11 subacute or subcuspidate 7-9-nerved. Miq. Fl. Ind. Bat. iii. 460; Trim. Cat. Ceyl. Pl. 104. I. dispar, Herb. Wight. I. Metzii, Hochst. in Hohen. Pl. Ind. Or. n. 1276. I. Neesiana, Arn. ex Steud. Syn Gram. 96. Panicum cuspidalume, Steud. Kunthianum, Wight & Arn. & Metzii, Hochst. ex Steud. l. c. 96, 95. P. obliquum, Moritz. ex Miq. l. c., Steud. l. c. P. Burmanni, et P. marginatum, var. Heyne ex Wall. Cat. n. 8734. A.

NILGHIEI and TRAVANCORE HILLS, alt. 6-8000 ft., Hoyne, &c. SINGAPORE, Ridley. CEYLON; in clevated districts.—DISTRIB. Java, Borneo.

Stem ascending, geniculate, branched. Leaves \(\frac{1}{2} - 2\frac{1}{2} \) in., striate, spreading, smooth or scaberulous above, base cordate, midrib and nerves obscure; ligule of hairs. Panicle \(2-2\frac{1}{2} \) in.; branches short, rather stout, at length horizontal, pubescent or glabrous. Spikelets \(\frac{1}{10} - \frac{1}{16} \) in.; very shortly pedicelled; gl. I and II smooth

hispid or bristly; III and IV subsqual or III rather the largest, glabrous or puberulous.—I. Neesiana, is rather more glabrous, and has rather more unequal gls. III and IV, but these characters are too variable to found a distinct variety upon.

Var. latifolia; stem 12-16 in. stouter, leaves 2-3 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in. and sheaths sparsely hairy, midrib and 2-3 pairs of principal nerves distinct.—Nitghiri Hills, alt. 6000 ft., \(Lawson;\) Anamallay Hills, \(Beddome.-\text{Almost}\) intermediate between

I. Kunthiana and elatior.

2. I. elatior, Hook. f.; nearly glabrous, stem 2-4 ft., nodes tomentose, leaves 3-4 in. ovate-lanceolate acuminate thin scabrid above, panicle 5-7 in., branches many slender, gl. I and II subcuspidate 5-9-nerved.

CEYLON, Gardner; Newers Ellis, Thwaites (CP. 314).

Included by Thwaites under I. Kunthiana, possibly correctly, but a very different looking plant, from its great size, thin leaves and much larger many-fid. panicle, with longer branches.

3. **I. Lisbose**, *Hook. f.*; glabrous, stem creeping, branches ascending, leaves thin oblong-lanceolate, panicle with few horizontal stout hispidly setulose branches, gl. I and II 5-nerved hispid, III and IV equal.

The Concan; Mahableshwar, Lisboa.

Stem creeping for several inches with long wiry roots, then ascending, and 6 in. high, rather stout. Leaves 1-2 in. by $\frac{1}{3}$ in., recurved, thin, acute or obtuse, finely striate; base rounded, margins ciliate; sheaths loose; ligule 0. Paniels with the rachis quite smooth. Spikelets $\frac{1}{10}$ in. diam., secund on the lower surface of the branches, sessile or shortly pedicelled; gl. I and II hemispheric, 5-ribbed, tip obtusely cuspidate, a little larger than III which is glabrous.—I have seen but one specimen of this species, which probably varies like its congeners in the smoothness or hispidity of the spikelets. The 5-ribs of gl. I and II are good characters.

- ++ Glumes I and II much shorter than IV.
- 4. I. multiflora, Trim. Cat. Ceyl. Pl. 104. I. australis, var. multiflora, Thw. Enum. Pl. Zeyl. 361.

CEYLON.; Oova district, alt. 5000 ft., Thwaites.

Stem 1-2 ft. or more, branched, and sheaths smooth. Leaves 4-6 by \(\frac{1}{4}\)-\(\frac{1}{3}\) in., smooth, deeply striate, margins hardly thickened, nerves obscure. Panicle 4-7 in.; branches many, long, suberect, and very short pedicels subcapillary. Spikelets \(\frac{1}{10}\) in., glabrous, glistening, purplish; gl. I oblong-ovate, 7-nerved; II as long, glabrous; III oblong-lanceolate, empty; IV much shorter, broadly oblong, obtuse, glabrous.

- +++ Glumes I and II about equalling IV.
- § Glumes III and IV usually equal and similar, both hemispheric and coriaceous.
- 5. **Z. albens**, Trin. Sp. Gram. Ic. t. 25; tall, erect, leaves and sheaths smooth, panicle large pyramidal effuse, spikelets $\frac{1}{20} \frac{1}{20}$ in. rather shortly pedicelled, globose. Kunth Enum. Pl. i. 137; Miq. Fl. Ind. Bat. iii. 459. Duthie Grass. N. W. Ind. 2 (excl. Syn.), Fodd. Grass. N. Ind. 3. Panicum albens, saxatile & Zollingeri, Steud. Syn. Gram. 96, 97.—Isachne, Wall. Cut. n. 8658.

TEMPERATE and SUBTROPICAL HIMALAYA and the KHASIA HILLS, alt. 2-6000 ft. from Simla enstward; ascending to 9000 ft. in Sikkim. BURMA, Grifith. PERAK, alt. 4600 ft. Wray.—DISTRIB. China, Mulaya.

Stem 1-1 ft., branched. Leaves 2-8 in., very variable (1-1 in.) in width, linear

or linear-lanceolate, glabrous or sparsely hairy beneath; margins thickened, scaberulous; midrib and 3-5 pairs of principal nerves distinct, mouth of sheath ciliate. Pasicle 3-14 in long, branches and pedicels capillary: gl. I and II obtuse. glabrous or sparsely setulose, usually pale green, faintly many-nerved; III and IV glabrous or pubescent, both often bisexual.

Var. hirtha; leaves broad, sheaths hirsute.—Isachne, Wall. Cat. n. 8657.—

Silhet, de Silva. Cachar, Keenan.

6. I. scabrosa, Hook. f.; leaves subcrect, sheaths scabrid, panicle 2-3 in. pyramidal, spikelets 10-16 in.

KHASIA HILLS, alt. 4500-5000 ft. Clarke.

Stom rambling below, then suberect, 1-3 ft., stiff, sparingly branched. Leaves 3-6 by 1-1 in., linear-lanceolate, scabrid on both surfaces, pale and strongly-nerved beneath, margin thickened; mouth of sheath sparingly ciliate. Panicle very shortly peduncled; branches erecto-patent, 1-11 in, long; pedicels capillary, smooth, tips not swollen. Spikelets sparsely setulose, tips rounded; gl. I and II glabrous or sparsely setose, many-nerved.—Easily distinguished from P. albens and hima'aica by the scabrid leaf-sheaths; but most nearly ailied to the latter.

7. I. himalaica, Hook. f.; erect, leaves linear or linear-lanceolate strict scaberulous above, margins slightly thickened, sheaths smooth, panicle pyramidal, spikelet; 12-14 in. globose, pedicels long capillary tips hardly thickened, gl. I and II faintly many-nerved. I anstralis, Aitchis. Cat. Punjab. Pl. 761; Herb. Ind. Or. Hf. & T. (the Khasian plant); Duthie Grass. N.W Ind. 2, Fodd. Grass N. Ind. 3. I. muricata, Munro in Herb. Strach. & Winterb. No. 2. Planicum montanum, Duthie Grass. N.W. Ind. 4.—Isachne, Wall. Cat. n. 8656, D E.

WESTERN TEMPERATE and SUBTROPICAL HIMALAYA; in wet places, ascending to 6000 ft.: KUMAON, Strach. & Winterb. NEPAL, Wallich. PIBHAWUR, Aitchison. RAJAOH, Jacquemont. KHASIA HILLS, in marshes, alt. 4-5 00 ft. common.

-DISTRIB. Affghanistan.

Stem 1-2 ft., erect from the base, stout or slender, stiff. Leaves always narrow (1-1 in.), nearly ensiform; nerves 9-11 pair, usually very strong, margins thickened: mouth of sheath stiffly ciliate. Panicle with erecto-patent branches 1-1; in. long. Spikelets green or purplish; gl. I and II glabrous scabrous or bristly, III sometimes longer and flatter than IV .- Very like I. australis, but a larger and more rigid plant, with gl. II and III usually equal, and both hemispheric. .

In a note in Munro's herbarium this is referred to the Javan I. virgata, Nees (Mig. Fl. Ind. Bat. iii. 462 = Panicum rhabdinum, Steud.), but that is described as being fastigiate spikelets, and glumes with narrowed obtuse mucronate points. It

closely resembles a Sumatran plant from Beccari (n. 198).

8. I. elegans, Dalzell mss.; erect, tufted, flaccid, glabrous or nearly so, leaves 2-5 in. very narrowly linear acute soft smooth on both surfaces or scaberulous above, margins thickened, panicle subsessile contracted. branches erect, spikelets 12-10 in. pedicels short, tips rounded, gl. I and II many-nerved.

The Concan, Dalzell, Stocks, in wet places between Poonsh and Carli, Jacque-

mont (n. 143), Woodrow (n. 175).

Stems 8-12 in., densely tufted, soft. Leaves 1-1 in. broad, principal nerves 0 or 1-2 on each side, margins thickened, smooth or serrulate, rarely with a few scattered bristles beneath; sheath quite smooth, mouth ciliate. Panicle 3-5 in., glabrous; branches 1-1 in., smooth; pedicels rarely longer than the spikelets, which are hispid green or bluelsh, gls. III and 1V pubescent, usually equal and both hemispheric, but III sometimes longer and flatter .- The tufted flaccid habit is quite unlike I. quetralis, but may be due to local conditions.

9. **I. javana**, Nees ex Miq. Pl. Jungh. 376, & Fl. Ind. Bat. iii. 462; stout, erect, leaves 2-3 in. acute or obtuse stiff glaucous beneath. margins much thickened, paniele lax, branches and pedicels 'very long and slender tips obconic, spikelets obovoid 14-12 in. long. Panicum batavicum, Steud. Syn. Gram. 96.

UPPER BURMA, Herb. Hort. Calcutt. MALACCA. Maingay; Mr. Ophir, T. Lobb, Hullett. Perak; on Gunong Bubu, alt. 5000 ft. Wray.—DISTRIB. Java, Borneo.

Habit of I. himalaica. Stem 2-3 ft., quite smooth, stiff; nodes ciliolate. Leaves erect or erecto-patent, strict, nearly smooth on both surfaces, or sparsely hairy beneath, with 9-11 pairs of often very obscure nerves, margin smooth or serrulate; sheaths quite smooth, margins glabrous or ciliate, mouth bearded. Paniels 2-4 in., glabrous, lower branches 2-3 in.; pedicels more thickened at the tip than in most other species. Spikelets broad, smooth; gl. I and II often polished; nerves many, obscure; III and IV usually equal and both hemispheric; III rarely larger and flattened, usually male; IV fem or bisexual; sometimes both III. and IV. are triandrous or hexandrous, in one spikelet III was triandrous and IV tetrandrous.—A much larger plant than I. australis.

10. **I. Clarkei**, *Hook.f.*; stem short very slender, leaves 1-2 in. ovate-lanceolate acute very thin, margins thickened serrulate, panicle 2-3 in. pyramidal, branches horizontal and pedicels capillary tips slightly thickened, spikelets $\frac{1}{3}$ 0 - $\frac{1}{3}$ 0 in.

SIKKIM HIMALAYA; meadows in the Lachoong valley, alt. 8-11,000 ft.— J. D. H. MUNNIPORE; on Kohima, alt. 5800 ft. Clarke.

Stems 6-12 in., almost filiform, base prostrate. Leaves spreading, almost membranous, nerves many faint, midrib obscure; sheath and its mouth often strongly ciliate. Panicle long-peduncled, branches 1 in. and less. Spikelets scattered, hispid, green or purplish; gl. IV. hispidly pubescent.—Apparently a distinct little species with very small spikelets, but possibly a small state of I. albens.

11. **2. rigida,** Nees ex Steud. Syn. Gram. 95; stems rigid much branched from the base, leaves $\frac{1}{2}-1$ in. rigid spreading and recurved ovate to ovate-lanceolate almost pungent scabrid base cordate margins thickened, panicle small pyramidal glandular, spikelets few $\frac{1}{20}$ in., pedicels long slender tip subclavate. Miq. Fl. Ind. Bat. iii. 461. I. Myosotis, Benth. Fl. Hongk. 415 (not of Nees). Panicum rhignon, Steud. 1. c. P. piluliferum, Nees ex Steud. 1. c. 24 (fide Herb. Munro).

TENASSERIM, Helfer. NICOBAR ISLDS., Kurz.—DISTRIB. Javs, Borneo, China. Stems 6-16 in., generally very long decumbent and naked below, internodes 1-1½ in., naked. Leaves deeply striate, with finely acuminate acicular tips, margins smooth cilialte or serrulate; sheaths ½ in., smooth scabrid or bristly. Panicle 1 in., peduncle stout; branches horizontal. Spikelets few, hispid; gl. I and II many-nerved, III and IV glubrous.—I take this to be the Javan I. rigida, Nees, from Steudel's description. It further agrees well enough with the descriptions of I. firmula and I. monticola, Buese.

- §§ Glume III usually flatter and thinner, and often longer than IV.
- 12. **I. australis**, Br. Prodr. 196; stems tufted ascending, leaves short lanceolate or linear-lanceolate acute margins not or very slightly thickened, sheath smooth, panicle ovoid or pyramidal, spikelets globose $\frac{1}{1-\frac{1}{2}}$ in. glabrous or setose, tips of pedicels hardly thickened. Kunth Enum. Pl. i. 136; Thr. Enum. Pl. Zeyl. 361 (in part, excl. Syn.); Trim. Cat. Ceyl. Pl. 104; Mirquel Fl. Ind. Bat. iii. 461; Benth. Fl. Hongk. 414, Fl. Austral. vii. 625; Hook. f. Handb. N. Zeal. Fl. 324; Buchan. Grasses

N. Zeald. t. 12; Bailey Grasses Queensl. t. 1; Franch. & Sav. En. Pt. Jap. ii. 164. I. atro-vivens, Trin. Gram. Panic. 251. I. lepidota, Steud. in Flora, xxix. (1846) 19; Walp. Ann. i. 924. Panicum antipodum, Spreng. Syst. i. 314; Steud. Syn. Gram. 94. P. atro-vivens, Trin. ex Spreng. New Entdeck. ii. 88, Syst. Veg. i. 318; Kunth l. c. 127. P. australis, Rasp. in Ann. Sc. Nat. v. (1825) 299. P. lepidotum, Steud. in Flora, Xxix. (1846) 19. P. nodibarbatum, Hochst. Pl. Hohenack. n. 127; Steud. l. c. 95. P. violaceum, Kleine ex Thiele in Linnea, ix. (1834) 307. Aira ischemoides, Koen. ex Kunth l. c. 127. Milium globosum, Thunb. Fl. Jap. 49.—Isachne, Wall. Oat. n. 8656, A B C F.

Hotter parts of India, from Assam and Burms to Central India and south-

ward to CEYLON. - DISTRIB. Austral., N. Zeald.

Stem 8-18 in. from a creeping branching base; nodes glabrous or sparsely bearded. Leaves 1-3 in., rarely more, subscaberulous above or on both surfaces, margins ciliolate, nerves 0 or 2 3 very slender pairs, midrib obscure; sheaths smooth mouth and often margins ciliate. Panicle 1-3 in., contracted and ovoid or pyramidal and open; branches glabrons or obscurely scaberulous, and as the pediculs very variable in length. Spikelets green or purplish, obtuse, smooth and polished or scabrid or setulose; gl. I and II faintly many-nerved; III and IV usually very unequal, III longer, flatter, thinner, shining; IV coriaceous, glabrous or pubescent, orbicular or broadly ellipsoid.—I. mauritiana, Kunth, is a very closely allied species, but has gl. III and IV equal and similar; it is Panicum dubium and biforum, Lamk.

Var. effusa, Trim. Ca. Ceyl. Pl. 104; panicle pyramidal, branches longer, and pedicels spreading capillary, spikelets rather smaller.—Ceylon; Peradeniya, Trimen.

13. **X. miliacea**, Reth Nov. Pl. 58; stems very slender prostrate widely creeping and branched below then ascending, leaves small ovatelanceolate acute margins not or faintly thickened, panicle small contracted or spreading lax-fid. spikelets $\frac{1}{10} - \frac{1}{10}$ in., pedicels short tips hardly thickened. Kunth Enum. Pl. i. 136; Mig. Fl. Ind. Bat. iii. 459 (excl. some syns.). I. Meneritana, Poir. Encycl. Suppl. iii. 185 (excl. Syn.); Br Prodr. 196. I. minutula, Kunth Revis. Gram. ii. t. 117, Enum. Pl. i. 137, Suppl. 99. I. adstans, Mig. l.c. 461. I. polygonoides, Doell in Mart. Fl. Bras. ii. II 273. I. geniculata & stigmatosa, Grif. Notul. iii. 41, 42. C. Pl. Asiat. t. 139, f. 206, 148, f. 2. Panicum æquatum. Nees ex Steud. l.c. 98. P. sdstans, Steud. l.c. 94. P. Benjamini, Steud. l.c. 96, ex Mig. l.c. 459. P. Meneritana, Spreng. Syst. i. 321. P. minutulum. Gaud. in Freyc. Voy. Bot. 410; Steud. l.c. P. polygonoides, Lam. Encycl. iv. 742; Decne in Nouv. Ann.. Mus. Pur. iii. 352. P. patens, Roxb. Fl. Ind. i. 305; Kunth l.c. 126; Hohenack. Pl. Ind. Or. n. 202. P. gonatodes, Steud. l.c. 95. Neurachne Meneritana, Roem. & Sch. Syst. ii. 475 (excl. syn.). Aira coerulea, var. Herb. Heyne.—Isachne, Wall. Cat. n. 8655.

Low marshy ground, from the SIRKIM TERMI, BENGAL and SILBET to BURMA and southward to MALACCA, the NICOBAR ISLDS., and CEYLON.—DISTRIB. China,

the Malay and Pacific Islds., S. America.

Very variable in size; stem rarely 6-8 in. high, nodes of stem glabrous or ciliate; sheaths glabrous or sparsely hairy. Leaves flaccid or rather stiff, usually spreading, nerveless or nearly so, glabrous or sparsely hairy on both surfaces. Spikelets as in I. australis, but usually smaller, glabrous, rarely sparsely setose; gl. I and II 5- or more-nerved; IV glabrous or pubescent.—The small states of this plant look very different from typical I. australis, but larger appear to unite them by man; intermediates. Trimen refers I. Meneritana to I. australis, Mr. Rendle, who has carefully compared the types of each in the British Museum, agrees with me that it goes best with miliacea. He also informs me that Burman's Thes.

VOL. VII.

- Zeyl. 110, t. 47, f. 3, is not an Isachne, but resembles an Eragrostis; and that Plukenet's Phyt. t. 300, f. 2. (in Herb. Sloane) is E. ciliaris from the Malabar Coast. Trimen has pointed out (Journ. B.t. xxxiii. (1885) 271) that the "Meneritana of the Cingalese is not an Isachne, but is applied to Panicum miliare and psilopodium.
- 14. **I. dispar,** Trin. Sp. Gram. Ic. t. 6; stem short ascending from a branched creeping base, leaves $\frac{1}{2}-1$ in. ovate-cordate to lanceolate acuminate scaberulous margins thickened, panicle oblong at length pyramidal, spikelets $\gamma_1 \gamma_2$ in., pedicels short tips thickened. Kunth Enum. Pl. i. 136; Duthie Grass. N.W. Ind. 2; Miq. Fl. Ind. Bat. iii. 460. I. muricata. Nees in Wight. Cat. (ex. Miq. l.c.). Panicum dispar, Steud. Syn. Gram. 96. PP. muricatum, Retz. Obs. v. 18.

NEPAL, Wallich. SIRKIM TERAI, Clarke. RAJPOOTANA, on Mt. Aboo, King, Duthie. NILGHIRI HILLS, alt. 5000 ft. Clarke.

Stems 2-6 in. Leaves spreading, rather rigid, striated; midrib slender. Spikelets as in I. australis; pedicels smooth or rough; gl. I and II scabrid or setulose,
nerves many, faint; III glabrous; IV pubescent.—This again is perhaps a var. of
I. australis, of lower stature with more rigid scaberulous strongly margined leaves,
sometimes ciliate at the base, and smaller panicles with shorter pedicels.

- ** Spikelets 1 in. long.
- 15. I. Walkeri, Wight & Arn. ex Thw. Enum. Pl. Zeyl. 361; tall, slender, leaves linear-lanceolate acuminate margins thickened, panicle very lax branches and pedicels very long capillary, gls. I and II subequal 7-9-nerved. I. nilapirica, Hochst. Pl. Hohenack. n. 1280; Trim. Cat. Ceyl. Pl. 104. Panicum Walkeri, Steud. Syn. Gram. 97.

NILGHIBI HILLS; Khoondah Ghat, Wight; Conoor, alt. 6000 ft., Clarke, &c. CEYLON; forests of the Central Province, Walker, Thwaites (C.P. 282).

- Stem 2-3 ft., as thick as a crow-quill, decumbent below. Leaves 4-6 by \(\frac{1}{4}\)-\(\frac{1}{2}\) in., rigid, smooth above, hairy beneath with a distinct midrib and 3-5 pairs of primary nerves, base narrow rounded; sheath smooth, margins above and mouth bearded. Panicle 8-12 in.; branches 1\(\frac{1}{2}\)-3 in., sparingly divided. Spikelets \(\frac{1}{6}\)-\(\frac{1}{2}\) in., few, very distant; gl. I and II persistent, oblong, obtuse; III and IV oblong, obtuse, glabrous.
- 16. **I. Gardneri,** Benth. in Gen. Pl. iii. 1100; tall, slender, leaves lanceolate acuminate margins hardly thickened, panicle very lax, branches and pedicels very long filiform, gl. I much shorter than 11 3-nerved, II 5-nerved. I. nilagirica, Trim. Cat. Pl. Ceyl. 104 (non Hochst.). Panicum Gardneri, Thw. Enum. Pl. Zeyl. 359.

NILGHIEI HILLS; Madawattan, alt. 6000 ft., Lawson. ANAMALLAY HILLS, Beddome. CEYLON; Central Provinces, alt. 4-6000 ft., Gardner, Thwaites, &c.

Stem 2-3 ft., slender, quite smooth, decumbent below. Leaves 2-3 by \(\frac{1}{4} \) in., thin, glabrous or sparsely hairy beneath, base broad cordate, principal nerves 3-4 pairs, very slender; mouth of sheath ciliate. Panicle with widely spreading sparingly divided branches; tip of pedicel thickened. Spikelets \(\frac{1}{4} - \frac{1}{4} \) in., few, distant, oblong; gl. I and II obtuse glabrous or sparsely setose, I ovate; II ovate-oblong; III and IV elliptic-oblong, acute, quite smooth.

4. PANICUM, Linn. .

Annual or perennial grasses. Leaves various. Spikelets small, 1-2-fld., terete or dorsally or laterally compressed, articulate on their pediceis, very rarely awned, never silkily villous; glumes 4, I and II empty, epaleate;

I smallest and fewest nerved; II. and III usually subequal, 3- ∞ -nerved oblong ovate or lanceolate; III paleate or not, triandrous or neuter; IV paleate, bisexual, oblong ovate or lanceolate, hardened in fruit, glabrous, dorsally convex; palea 2-nerved, membranous or hardened in fruit. Lodicules 2, cuneate or quadrate, rarely 0. Stamens 3, apically exserted. Grain free within gl. IV and palea.—Species very many; all warm countries.

Exceptions. In P. subeglume, gl. I and II are absent. In P. Crus-galli gl. III is sometimes produced into a rigid long or short awn. In P. notabile, ambiguum and javanicum, gl. IV is crowned with a short awn that is concealed by gls. II and III.

Under Paspalum (p. 10), I have given my reasons for removing to that genue the group Digitaria, which has hitherto been referred to Panioum; those for excluding Tricholana and Annopus will appear under the respective genera. Ichnanthus is excluded on less satisfactory grounds.

KEY TO THE SECTIONS.

- A. Spikelets terete or dorsally compressed.
- I. Branchlets of panicle not produced beyond the terminal spikelets into awn-like bristles.
- Sect. I. PASPALOIDEM. Spikelets 2-seriate, close-set on the undersurface of the flat rachis of a simple spike, globose or ovoid; awn 0; gl. I very small, IV more or less rugose.—Perennials. Spikes alternate forming a simple raceme. (Sp. 1-4.)
- Sect. II. Echinochica. Spikelets 3-4-seriate (2-seriate in P. notabile) crowded on the undersurface of a simple or rarely branched spike, globose or ovoid; gl. I half as long as III or shorter, II and III strongly nerved cuspidate or rigidly awned, IV hard in fruit.—Annuals. Spikes alternate or crowded in usually a simple raceme. (Sp. 5-7.)
- Sect. III. Brachiaria. Spikelets irregularly 1-2- (rarely 3-) seriate on the slender or spiciform branches of a simple raceme, solitary or geminate, distant or crowded, evoid or obovoid; gl. I not half as long as III (except in *P. ambiguum*), II and III subequal, awn 0, or IV with a very short awn concealed by gls. II and III. (Sp. 8-18.)
- Sect. IV. HYMENACHNE. Spikelets small, crowded in spiciform panicles (except P. auratum and curvatum) ovoid or lanceolate, sometimes decurved; gls. usually strongly ribbed, I much shorter than III, IV usually much shorter than III, narrow, white. (Sp. 19-25.)

Most of the species of this section are very variable.

- Sect. V. Breviglume. Spikelets very small, in pairs or fascicles on the filiform branches of a lax panicle or simple rachis, dorsally much compressed; gl. I and II both much shorter than IV, III and IV lanceolate. (Sp. 26, 27.)
- Sect. VI. Effus. Spikelets solitary, rarely binate, sessile or pedicelled on the stender branches of a decompound usually open panicle. (See also P. auratum and curvatum in Sect. Hymenachne.) (Sp. 28-47.)

II. Branchlets of panicle often produced beyond the terminal spikelet into a rigid awn-like bristle.

Sect. VII. PTYCHOPHYLLUM. Spikelets solitary, sessile or pedicelled on the slender branches of a decompound open paniele. Leaves plicate. (See also Setaria Forbesiana.) (Sp. 48, 49.)

B. Spikelets strongly laterally compressed.

Sect. VIII. Gibbos. Spikelets very minute, panicled; gl. IV semiluar. Perennial very slender grasses. (Sp. 50-54.)

Sect. IX. Pseudechinolæna. Spikelets rather large, distant, subsessile on a slender simple or sparingly divided rachis, often glandular. (Sp. 55.)

Sect. I. Paspaloidez. (See p. 27.)

1. P. Isachne, Roth Nov. Sp. 54; spikes many longer than the internodes, spikelets 13; in. suberect oblong acute villous, gl. I minute, II and III equal faintly 3-nerved, II = IV, III paleate empty, IV oblong rounded at both ends quite smooth. Roem. & Sch. Syst. ii. 458; Schult. Mant. ii. 252; Kunth Enum. Pl. i. 97; Steud. Syn. Gram. 57. P. eruciforme, Sibth. Fl. Grec. i. t. 59; Sibth. & Sm. Prodr. Fl. Grec. i. 40; Roem. & Sch. l. c. 426; Kunth l. c. 78; Thw. Enum. Pl. Zeyl. 359; Trim. Cat. Ceyl. Pl. 104; Duthie Grass. N. W. Ind. 3, Indig. Fodd. Grass. t. 43, Fodd. Grass. N. Ind. 6; Baker Fl. Maurit. 434; Parlat. Fl. Ital. i. 119; Boiss. Fl. Orient. v. 437. P. Koenigii, Herb. Wight ex Nees Fl. Afr. Austr. 30. P. caucasicum, Trin. in Mem. Acad. Petersb. Ser. 6 (1835) iii. 237, Sp. Gram. Ic. t. 262, Panic. Gen. 149; Steud. l. c. P. Crus Galli, Rozb. ex Wight Cat. n. 1616 (non Fl. Ind.) P. pubinode, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 363; Steud. l. c. 57. P. Wightianum, Arn. & Nees. ex Nees Fl. Afr. Austr. 30. P. Wightii, Nees l. c. 29; Trin. Pan. Gen. 148; Steud. l. c. 58. Brachiaria eruciformis, Griseb. in Ledeb Fl. Ross. iv. 469. Echinochloa eruciformis, Reichb. Ic. Fl. Germ. t. 29; C. Koch, in Linnea, xxi. (1848) 437.—Panicum, Wall. Cat. n. 8693.

Plains of INDIA; in watery places, from Kashmir, alt. 6000 ft., and the Panjab, to Bengal, and southward to CEYLON.—DISTRIB. Westward to Italy and N. Africa.

Stems 1-2 ft., slender, ascending from a decumbent base, much branched; nodes often bearded. Leaves 1-2\frac{1}{2} in. by \frac{1}{2} in., glaucous, linear-lanceolate, acuminate, flat, glabrous or softly hairy, base rounded; mouth of sheath with long hairs. Spikes 8-12, \frac{1}{2} in. long, erect or subcrect; rachis narrower than the spikelets, ciliate. Spikelets subsessile, very pale; gls. membranous, I cordate; II about \frac{3}{2} shorter than IV, which is white.

2. P. flavidum, Retz. Obs. iv. 15; spikes erect shorter than the internodes, spikelets 18-16 in. divaricate gibbously globose glabrous, gl. I = about 18 III suborbicular 3-nerved, II nearly = IV 7-nerved tip rounded, III oblong obtuse 3-5-nerved paleate neuter, IV broadly ovate cuspidate reticulately punctulate. Br. Prodr. 190; Kunth Revis. Gram. i. 211, t. 17, Enum. Pl. i. 78, Suppl. 60; Trin. Panic. Gen. 151; Nees Agrost. Bras. ii. 116; Griff. Notul. iii. 33, Ic. Pl. Asiat. t. 139, fig. 67; Duthie Grass. N.W. Ind. 3, Indig. Fodd. Grass. t. vi., Fodd. Grass. N. Ind. 7; Wight Cat. n. 1613, & Herb. n. 3059; Wall. Cat. n. 8692 (excl. B, & H

partim); Benth. Fl. Austral. vii. 474. P. brizoides, Jacq. Eclog. Gram. 2, t. 2; Trin. Dies. ii. 128, Sp. Gram. Ic. t. 158, 159; Kunth Enum. Pl. i. 78; Roxb. Fl. Ind. i. 293; Ibilz. & Gibs. Bomb. Fl. 290; Thw. Enum. Pl. Zeyl. 359; Trim. Cat. Ceyl. Pl. 159; Duthie Grass. N.W. Ind. 2; Miq. Fl. Ind. Bat. iii. 445; Aitchis. Cat. Panjab Pl. 159; Nees Agrost. Bras. 115; Baker Fl. Maurit. 433. P. distans, Trin. Sp. Gram. Ic. t. 172. P. brizoides, var. distans, Trin. Ic. t. 159 B. P. flaccidum, Koen. mss. in Herb. Mus. Brit. P. floridum, Royle Ill. Bot. Himal. 420. P. granulare, Lam. I/l. i. 170, Encycl. iv. 740; Trin. Dies. ii. 129. P. Sama, Ham. ex Wall. Cat. 8692 F.

Plains of India; in watery places from the Panjab to Assam and Burma, ascending to 5000 ft. in Nepal and Kumaon, and southward to CEYLON.—DISTRIB. Trop. Asia and Africa.

Stem 1-4 ft., compressed, leafy, branched from the decumbent base. Leaves bifarious, 3-5 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., linear-lanceolate acuminate, or ligulate with a rounded tip; sheaths compressed, lower tumid, mouth hairy; ligule 0. Spikes few or many, distant, \(\frac{1}{2}\)-1 in. Spikelets 2-20, very pale, sessile. Glumes membranous, white with green nerves; III neuter or male; IV sometimes almost orbicular, white or brownish, very minutely rough.—The var. distans of Trinius is a depauperate state, and occurs on the same plant as the normal. A still more depauperate form, densely tufted, with stems and leaves 2-3 in. long and very few spikelets, is Wall. Cat. 8692 D from Herb. Wight, also found in Bengal. Mr. Rendle informs me that the name favidum may be a mistake for flaccidum, under which Koenig sent it to Retzius from Herb. Mus. Brit. where it is named faccidum.

3. P. punctatum, Burm. Fl. Ind. 26; spikes longer than the internodes tip usually excurrent setiform, spikelets $\frac{1}{20}$ — $\frac{1}{16}$ in. plano-convex erectopatent glabrous, gl. I very short truncate, II = about half IV suborbicular 3-uerved tip rounded or truncate, III ovate acute 3-5-nerved neuter, IV ovate cuspidately acuminate granulate. P. fluitans, Retz. Obs. iii. 8 (not v. 18); Rozb. Fl. Ind. i. 293; Griff. Notul. iii. 25, Ic. Pl. Asiat. 139, f. 231; Dalz. & Gibs. Bomb. Fl. 290; Thw. Enum. Pl. Zeyl. 339; Trim. Cat. Ceyl. Pl. 104; Aitchis. Cat. Panjab. Pl. 159; Duthie Grass. N.W. Ind. 4, Indig. Fodd. Grass. t. 44, Fodd. Grass. N. Ind. 7; Baker Fl. Maurit. 433; Boiss. Fl. Orient. v. 437; Sleud. Syn. Gram. 59; Nees Agrost. Bras. 115. P. brizoides, Retz. l. c.; Rottl. in Naturf. rl. Ges. Neue Schrift. iv. (1803), 211; Wall. Cat. n. 8690; Wight Cat. n. 1614. P. fluitans, Herb. Madr. • Wall. Cat. n. 8692 B. P. granulare, Bojer Hort. Maurit. 364. P. mucronatum, Roth Nov. Sp. 45; Steud. l. c.; Nees Agrost. Bras. 116. P. paspaloides, Wall. l. c. n. 8691 A (partim), B.

Marshes throughout India, from the Panjab to Assam, and southwards to Malacca and CEYLON.—DISTRIB. Malaya, Mauritius, trop. and N. Africa.

Perennial, quite glabrous. Stem 2-4 ft., base floating, rooting at the nodes; lower internodes very stout, spongy. Leaves 4-8 in., linear, acute. or acuminate; lower sheaths dilated; ligule a ring of hairs. Spikes many, 4-1 in., distant, sessile, secund, appressed to the glabrous rachis, very pale; rachis about 1/2 in. broad, margin quite smooth, tip free acicular as long as the upper spikelet. Spikelets 1/2-1/2 in. long, imbricate, sessile, ovate-oblong. Glumes membranous, IV as long as III.—Mr. Rendle informs me that he has examined in the British Museum the specimen (in Herb. Sloane) on the figure of which Burman founded P. punctatum, and that it is the same as P. fuitans, Retz. And further, that the name fuitans is a ms. one of Koenig, and was no doubt sent by him to Retz, who says that he received the plant from Koenig. As to the rival claims of punctatum and fluitans for adoption, the former (published in 1768) has a quarter of century's priority; but whereas the P. fluitans has had more than a century of recognition in all countries, P. punctatum

has never till now been recognized, nor could it have been from Burman's description only. Under these circumstances, and taking into consideration the facts, that Retz described two different plants under the name of fluitans? and that punctatum has been applied to no other species, I have adopted the latter.

4. P. paspaloides, Pers. Syn. i. 81 (paspalodes); spikes erect longer than the internodes, spikelets \(\frac{1}{10} - \frac{1}{15} \) in. erecto-patent subglobose glabrous, gl. I very short suborbicular retuse, II nearly = IV strongly 5-nerved tip rounded, III broadly ovate acute 5-nerved paleste neuter, IV oblong subacute nearly smooth. Kunth Enum. Pl. i. 77; Trin. Pan. Gen. 153. Wall. Oat. 8691 (in part); Steud. Syn. Gram. 60; Boiss. Fl. Orient. v. 436. P. affine, Nees Agrost. Bras. 113. P. appressum, Doell in Mart. Fl. Bras. ii. II 184. P. beckmanniæforme, Mikan ex Trin. in Spreng. Neue Entdeck. ii. 83; Spreng. Syst. i. 309. P brizæforme, Presl Rel. Hænk. 302; Steud. l. c. 60. P. brizoides, Lamk. Itl. i. 170 (not Trin. or Jacq.). P. carnosum, Saltzm. ex Steud. l. c. P. fluitans, Retz. Obs. v. 18; Miq. Fl. Ind. Bat. iii. 455. P. numidianum, Sieb. ex Schult. Mant. ii. 267 (not Lamk.). P. truncatum, Trin. Diss. ii. 130, Sp. Gram. Ic. t. 168 (not t. 172). Paspalum adpressum, Pers. Syn. i. 85; Rich. ex Lamk. l. c. 176. Digitaria affinis, Roem. and Sch. Syst. ii. 470.

KUMAON, Strachey & Winterbottom, alt. 5000 ft. UPPER GANGETIC PLAIN; Delhi, Clarke. BUNDELKUND, Duthie. SCIND, the CONCAN, MALABAR and TRANQUEBAR, Heyne, &c. CEYLON, Walker, &c.—DISTRIB. Affghanistan, Arabia,

Afric. and Amer. trop.

Perennial, stem glabrous; prostrate, usually floating below and rooting at the nodes. Leaves spreading, linear, acuminate acute or obtuse, lower sheaths dilated. Spikes \(\frac{1}{2} \) in., appressed to the narrow, compressed, setulose rachis. Spikelets subsessile, turgid. Glumes membranous.—Habit of P. punctatum, which it closely resembles, but differs in the rachis of the spikes not produced at the tip with a few imperfect terminal spikelets, in the size of gl. II, in paleate III, and smooth IV.—P. brisoides, Lamk., is the earliest name, but it has been so promiscuously applied that it is better abandoned.

Sect. II. ECHINOCHLOA. (See p. 27.)

5. P. Grus-galli, Linn. Sp. Pl. 56; stem erect, leaves lipear flat glabrous or scabernlous, raceme contracted or pyramidal, spikes many 2-4 in. often secund simple or subcompound, rachis setulose, spikelets of 1-1 in. (excl. awn) subglobose hispid or scabrid rarely glabrous, gl. I = 1-1 ill acute 3-5-nerved, II = 111 mucronate or shortly awned, III paleate male or neuter awned, awn short or long rigid scabrid, IV ovoid obtuse or cuspidate and palea coriaceous shining white. Fl. Dan. t. 852, & t. 1564; Host Gram. Austr. ii. 15, t. 19; Encycl. Bot. t. 276; Knapp Gram. Britt. t. xi.; Reichb. Ic. Fl. Germ. t. 29; Trin. Sp. Gram. Ic. t. 161, 162; Wall. Cat. n. 8687 (excl. I.); Thw. Enum. Pl. Zeyl. 359 (excl. Syn. colonum); Trim. Cat. Ceyl. Pl. 104; Duthie Grass. N.W. Ind. 3, Indig. Fodd. Grass. t. 5, Fodd. Grass. N. Ind. 4; Miq. Fl. Ind. Bat. iii. 464; Benth. Fl. Hongk. 411, Fl. Austral. vii. 479; Boiss. Fl. Orient. v. 435; Franch. & Sav. En. Pl. Jap. ii. 160; Griseb. Fl. Brit. W. Ind. 546. P. Burmanni, Bieb. Fl. Taur. Cauc. iii. 57, ex Link. Hort. Berol. i. 204. P. corvipes, Stokes Bot. Mat. Med. i. 141. P. digitatum, Gilib. Exercit. 517. P. dubium, Sieb. ex Steud. Nom. Ed. II, ii. 256, Syn. Gram. 46. P. echinatum, Willd. Enum. Hort. Berol. 1032; Trin. Sp. Gram. Ic. t. 162; Jacq. Eclog. Gram. ii. 28, t. 20. P. hirtellum, Walt. Fl. Carol. 72. P. hirti-

calycinum, Steud. Nom. Ed. II, ii. 257. P. hispidulum, Lamk. Encycl. iv. 744 (non Del.); Retz Obs. v. 18; Roxb. Fl. Ind. i. 303 (fid. Ic. Pict.); Wall. Cat. 8688 A.; Wight Gat. n. 2042; Steud. Syn. Gram. 47; Franch. & Sav. l. c. 160. P. hispidum, Forst. Prodr. 7; Nees Agrost. Bras. 257. P. horridum, Saltzm. en Steud. l.c. 47. P. Hosti, Bieb. l.c. P. limosum, Presl en Nees l.c. P. longisetum, Torr. in Am. Journ. Sc. Ser. I iv. (1822) 58. P. mirabile, Braun Del. Sem. Hort. Carlsruhe (1846). P. muricatum, Michr. Fl. Bor. Am. i. 47. P. oryzinum, Gmel. Syst. i. 157; A. Braun in Ind. Sem. Hort. Berol. 1851. P. pilosum, Dalz. & Gibs. Bomb. Fl. Suppl. 98. P. sabulicolum, Nees Agrost. Bras. 258. P. scabrum, Lamk. Ill. i. 171; Wight Cat. n. 1648; Steud. l. c. 47. P. stagninum, Retz. Obs. v. 17; Host Gram. Austr. iii. t. 51; Koen. in Naturf. l. c.; Roxb. Fl. Ind. i. 295; Nees in Mart. l.c. 26; Griff. Notul. iii. 17; Wall. Cat. n. 8688; Wight Cat. n. 1649. P. Walteri, Pursh Fl. Am. Sept. i. 66. Oplismenus Crus-galli, Dum. Obs. Gram. Belg. 138; Kunth Revis. Gram. i. 44, Enum. Pl. i. 143; Host l. c. ii. t. 19; Trin. Sp. Gram. Ic. t. 161; Dalz. & Gibs. Bomb. Fl. 292. O. Crus-pavonis, H. B. &. K. Nov. Gen. & Sp. i. 108. O. P dubius, Kunth Rev. Gram. i. 44, Enum. i. 143. O. limosus, Presl Rel. Hænk. i. 321; Kunth Enum. i. 144. O. longisetus, Kunth Revis. Gram. l.c. O. muricatus, Kunth l.c. 44. O. sabulicolus, Kunth Enum. i. 145. O. scaber, Kunth Rev. Gram. i. 44. O. stagninus, Kunth Revis. l. c., Enum. l. c.; Dalz. & Gibs. l. c.; Aitchis. Cat. Punjab Pl. 161; Mig. l. c. 464. Echinochloa commutata, Schult. Mant. ii. 267. E. Crus corvi. Beauv. Agrost. 53. E. Crus-galli, Beauv. l.c.; T. Nees Gen. Fl. Germ. Monocot. I t. 21; Reichb. Ic. Fl. Germ. t. 29. E. P dubia, Roem & Sch. Syst. i. 479. E. hispida, Schult. l. c. E. hispidula, Nees in Royle 1ll. Bot. Himul. 416, 420; Dalz. & Gibs. l. c. Suppl. 98. E. stagnina, Beauv. l. c. Orthopogon Crus-galli & Retzii, Spreng. Syst. i. 307. Ischmmum abbreviatum & fasciculatum, Herb. Ham. ex Wall. Cat. n. 8688. Digitaria hispidula, Willd. Enum. Hort. Berol. 91. Milium Crus-galli, Moench. Meth. 202.

Throughout India, especially in wet places and rich soils—DISTRIB, all warm countries.

Annual. Stem 1-3 ft., stout or slender, erect or decumbent below, simple or branched. Leaves flat, up to an inch broad, glabrous or hairy; ligule 0. Raceme 4-8 in., usually inclined, or drooping. Spikes sessile or subsessile, upper gradually shorter, erect erecto-patent or rarely decurved. Spikelets densely packed in 3-5 rows, turgid; gl. I not awned; II and III subequal, usually 5-nerved, awn of III sometimes 14 in. long; IV from orbicular to broadly oblong.-Amongst the innumerable varieties of P. Crus-galli, I find it impossible to find characters constant enough for their limitation. Of exceptional states one with almost glabrous spikes is Echinochloa glabrescens (Munro mss.); it has large spikelets and cuspidate gls. It is Wallich's n. 8687 E. B. C. H., and has been collected in the Western Himalays, Kharia Hills and elsewhere. Another is Ischaemum glubrescens, Ham. ex Wall. Cat. n. 8688 D, with the stem nearly as thick as the little finger, solitary or 2-nate spikes, and spikelets with tubercle-based bristles. Thwaites CP. 900 and 8237, from Ceylon is a third, it has very broad leaves, and the rachis of the spikes is villously hairy. P. mirabile, Braun, is a remarkable plant, with 3-fld spikelets, the lower fl. paleate and neuter, two upper hermal brodite. Some forms with cuspidate, very short y awned spikelets pass into P. colonum, through var. frumentaceum, and it is not unlikely that some of the synonyms placed under P. Crus-galli should be transferred to P. colonum, and vice versa.

Var. frumentaceum; tall, robust, spikes thickened incurved sometimes corymbose with densely crowded unawned spikelets, otherwise as P. Crus-galli. P. frumentaceum, Rosb. Fl. Ind. i. 304; Schult. Mant. ii. 230; Trin. Sp. Gram. Ic. t. 164; Diss. ii. 132; Wall. Cat. n. 8686; Wight Cat. n. 1617; Duthie Grass. N.W. Ind. 4,

Field & Gard. Crops 3, t. 24, Fodd. Grass. N. Ind. 8; Franch. & Sav. En. Pl Jap. ii. 161. P. Crus-galli, Wall. Cat. n. 8687, C. G. P. Crus-galli, var. frumentaceum Trim. Cat. Ceyl. Pl. 104. P. grossum, Salisb. Prodr. 18. P. segetale, Herb. Rosb. Oplismenus frumentaceus, Kunth Revis. Gram. i. 45, Enum. Pl. i. 146; Dals. & Gibs. Bomb. Fl. Suppl. 98. Echinochloa frumentacea, Link Enum. Hort. Berol. i. 204; Aitchis. Cat. Panjab Pl. 161; Mig. Fl. Ind. Bat. iii. 465.—Cultivated in the hotter parts of Asia and Africa.—Roxburgh (Fl. Ind. l. c.) says of P. hispidulum, which is undoubtedly referable to P. Crus-galli, "it comes very near my P. frumentaceum, and may probably be the same in its wild state."

6. P. colonum, Linn. Syst. Ed. x. 870; stem rather slender decumbeut or shortly creeping below, leaves narrow scaberulous, raceme contracted. spikes suberect 1-11 in. usually distant, rachis pilose, sp kelete 10-18 in. acute or subcuspidate glabrous or hispidulous, gl. $1 = \frac{1}{4}$ III or shorter acute 3-5-nerved, II and III subequal acute, III paleate, IV ovoid or oblong obtuse or acute and palea corraceous white. Jacq. Eclog. Gram. t. 32°; Ehret. Ic. Sel. t. 3, f. 3; Beauv. Agrost. t. x. f. 6; Trin. Sp. Gram. Ic. t. 160; Steud. Syn. Gram. 46; Wall. Cat. n. 8685; Trim. Cat. Ceyl. Pl. 104; Duthie Grass. N.W. Ind. 3, Indig. Fodd. Grass. t. 4, Fodd. Grass. N. Ind. 4; Benth. Fl. Hongk. 411, Fl. Austral. vii. 478; Boiss. Fl. Orient. v. 435; Franch, & Sav. En. Pl. Jap. ii. 160; Griseb. Fl. Brit. W. Ind. 545. P. arabicum, Nees ex Steud. Nom. Ed. II, ii. 251, Syn. Gram. 63. P. brizoides, Linn. Mant. i. 184. P. casium, Nees in Hook. & Arn. Bot. Beech. Voy. 235; Steud. l. c. 47. P. confertum, Herb. Rottl. ex Wall. Cat. n. 8687 B. P. Crus-galli, Wall. Cat. n. 8687 I; var. colonum, Coss. Expl. Alger. 28; var. minor, Thw. Enum. Pl. Zeyl. 359. P. cuspidatum, Roxb. Fl. Ind. i. 298; Duthie Grass. N.W. Ind. 3; Steud. l.c.; Fig. & de Not. in. Mem. Acad. Tor. (1854) 340, t. xiii. f. 1-16. P. Daltoni, Parlat. ex Webb in Hook. Niger Fl. 185; Steud. l. c. P. flaccidum, Wall. Cat. n. 8692 H (in part). P. grossarium, Griff. Notul iii. 36, Ic. Pl. Asiat. t. 139, f. 113. P. hæmatodes, Presl Fl. Sic. i. 43; Steud. l. c. P. numidianum. Presl Cyp. & Gram. Sic. 19. P. Petiveri, Kotsch. ex Griseb. Fl. Brit. W. Ind. 545. P. pictum, Kon. in Naturf xxiii. (1788) 204; Wight Cat. n. 1648; Nees in Mart. Fl. Bras. ii. 120? P. Pseudo-colonum, Roth Nov. Sp. 147; Steud. l. c. 46. P. semiverticillatum, Herb. Rottl. (non Rottl. in Ainsl. Mat. Med.). P. tetrastichum, Forsk. Fl. Ag. Arab. 19. P. zonale, Prest Prodr. Fl. Sic. i. 82. Oplismenus colonus, H. B & K. Nov. Gen. & Sp. i. 108; Kunth Enum. Pl. i. 142; Dalz. & Gibs. Bomb. Fl. 291; Aitchis. Cat. Punjab Pl. 161. O.? cuspidatus. Kunth Revis. Gram. i. 45, Enum. i. 147. O. Pseudo-colonus, Kunth l. l. c. 44, 142. Digitaria? cuspidata, Schult. Mant. ii. 265.—Panicum, Wall. Cat. n. 8694, 8726.—Sloane Hist. Jam. i. t. 64, f. 3.

Throughout India and Ceylon, ascending the Himalaya to 6000 ft.—DISTRIB. all warm countries.

In its typical form P. colonum differs from Crus-galli by the characters given above, but there is a gradual transition of one into the other; and the cultivated var. frumentaceum has been assigned to both, having the unawned spikelets of the former, and the broad leaves robust habit and long crowded spikes with crowded spikelets of the latter. I find it very difficult in many cases to decide whether to refer certain specimens to the one or to the other, and am not at all confident that the synonymy of the two is in all cases right. Both Cosson and Thwaites regard colonum as a form of Crus-galli.

7. P. notabile, Hook. f.; spikes much longer than the internodes, rachis scabrid, spikelets in 2-3-seriate silkily hairy, gl. II subaristately

acuminate, III paleate male, IV orbicular-oblong rugulose shortly awned.
—Panicum, Wall. Cat. n. 8723.

BURMA; Petroleum wells of the Irawaddi. Wallich.

Stem 18-24 in., robust and foliage of Crus-galls, nodes pubescent. Leaves 3-5 in., finely acuminate, ciliate towards the base; sheaths sparsely hairy; ligule 0. Panicle 5 in., rachis flattened and angular, much narrower than the spikelete spikelete erect, imbricate, pale, sparsely silkily pubescent; gls. membranous, I=1 III, broadly ovate, obtuse, 3-nerved; II ovate, finely beaked, 5-nerved, hirsute; III very broadly obovate, cuspidately acuminate, the inflexed margins densely ciliate with long erect hairs; awn of IV as long as itself, strict, scabrid.—A very remarkable grass, with the habit of P. Crus-galli, but with the rugulose awned gl. IV of P. javanicum, and hence intermediate between the sections Echisochica and Brachlavia.

Sect. III. BEACHIABIA. (See p. 27.)

See P. turgidum in Sect. EFFUSE.

- * Gl. I nearly as long as III; IV shortly awned.
- 8. P. ambiguum, Trin. Gen. Panic. 155; leaves narrow hairy base rounded, spikes few subcrect, spikelets \(\frac{1}{2} \frac{1}{2} \) in., glabrous, gl. I ovate acute 5-nerved, II ovate-lanceolate acuminate 7-nerved, III epaleate, IV oblong minutely rugulose. Steud. Syn. Gram. 61. P. infidum, Trim. Cat. Ceyl. Pl. 104 (non Trin.). P. javanicum, Thw. Enum. Pl. Zeyl. 358. P. sanguinale, Burm. Fl. Ind. t. 10, f. 2 (non descr.). Urochloa paspaloides, Prest Rel. Hænk. i. 318 (fid. Trin.); Kunth Enum. Pl. i. 75.

BURMA; Mergui, Griffith. CEYLON, Gardner, Thwaites (CP. n. 858, 8244).-

DISTRIB. Mascarene, Malay and Pacific Islds.

Annual. Stems 1-2 ft., slender, much branched from the base; nodes glabrous or puberulous. Leaves 3-6 by 1-1 in., acuminate; sheaths glabrous or margins ciliate; ligule a tuft of hairs. Spikes 3-4, 1-2 in.; rachis slender, triquetrous, glabrous or with a few hairs at the nodes. Spikelets 2-seriate, alternate, suberect; palea of IV with green nerves; awn of IV concealed by II and III.—The subequal gls. I and III will distinguish this from all other species of the Brackiaria section. P. ambiguum, Fig. & de Notar. is a very different plant. Preal describes two varieties in the Philippines; a lower gl. hardly half as long as the others; \$\beta\$ glumes subsequilong. I have seen no Indian or other specimens answering to a.

- ** Gl. I much shorter than III; IV often abruptly apiculate.
 - § Spikelets 10-16 in.
- 9. P. prostratum, Lamk. Illustr. i. 171, Encycl. iv. 745; leaves short, base broad amplexicaul and sheaths ciliate, spikes usually crowded suberect, rachis trigonous, pedicels with long cilia, spikelets \(\frac{1}{10} \cdot \frac{1}{10} \) in. crowded subsessile 2-3-seriate ellipsoid glabrous, gl. I very short semilunar, II ovate acute 5-7-nerved, III 5-nerved paleate, IV obovate apiculate minutely rugulose. Trim. Diss. ii. 150, Panic. Gen. 158, Sp. Gram. Ic. t. 184, 185; Kunth Enum. Pl. i. 89, Suppl. 68; Steud. Syn. Gram. 62; Thw. Enum. Pl. Zeyl. 359; Trim. Cat. Ceyl. Pl. 105; Atichis. Cat. Panjab. Pl. 160; Duthie Grass. N.W. Ind. 6, Indig. Fodd. Grass. t. 45, Fodd. Grass. N. Ind. 11; Benth. Fl. Austral. vii. 476; Griseb. Fl. Brit. W. Ind. 540. P. barbatum, Lamk. Illustr. l. c. P. cesspitosum, Sw. Fl. Ind. Occ. i. 146. P. crispam, Llanos Fragment. 42. P. hirsutum, Heyne ex Wall. Cat. n. 8734 B. P. marginatum. Vahl ex Herb. Rottl. et ex Wall. Cat. n. 8732

B. P. procumbens, Nees Agrost. Bras. 109; Herb. Wight, n. 3052. P. repens, Burm. var. alt. Fl. Ind. t. 11, f. 1; Rottl. in Neue Schrift. iv. (1803) 182. P. setigerum, Herb. Roxb. ex Wall. Cat. n. 8733 A. D. P. Sieberi, Link. Hort. Berol. i. 207. P. viaticum, Saltzm. ex Doell, in Mart. Fl. Bras. ii. Il 155.—Panicum, Wall. Cat. n. 8733 A.—D. 8734 B. C. D. Gramen paniceum minus, &c. Petiv. ex Scheuchz. Agrost. 51 (non P. Petiverii, Trin.).

PLAINS OF INDIA, from the Panjab to Assam and Burms, and southward to

CEYLON.-DISTRIB. Tropics generally.

Annual or perennial, usually small; stem 4-18 in., creeping below; nodes glabrous. Leaves 1-2 in., up to \$\frac{1}{2}\$ in. broad, ovate-lanceolate, acuminate; sheaths ciliate; ligule 0. Panicle usually shortly peduncled. Spikes subsecund, at length spreading; rachis scabrid and hairy. Spikelets pale, rather turgid; pedicels with cilia longer than the spikelets; gl. I nerveless or 3-nerved; pales of III oblong, acute.—A common Bengal plant, of which and P. villosum I find it impossible to usravel the synonymy with confidence. Nees (Agrost. Bras. 109) includes under procumbens, repens, Burm. & Roxb. (not Linn.), prostratum, \$\beta\$ Lamk., setigerum, Retz & Roxb., umbrosum, Retz & Roxb., grossarium, Koen. (not Linn.), barbutum, Lamk., & subcordatum, Roth. Wight (Cat.) includes under procumbens, Nees, besides most of the above, P. hirtum, Roth (Rothii, Spreng.) which is Oplismenus compositus. Mr. Rendle informs me that Petiver; plant, which Trinius cites as the type of his P. Petiverii, is P. prostratum, Lamk., but that the P. Petiverii of Trinius' Icones is P. grossarium, Koen., not Linn.), which I refer to the P. ramossm.

Var. rigidum; stem very stout wholly prostrate much branched, leaves 1 in. triangular-ovate rigid pungent ciliate with long hairs.—Wall. Cat. n. 8723 (in part). Calcutta, Clarke? Burma, Wallich. (The specimen has evidently been misplaced

in the sheet of P. notabile.)

Var. burmanicum; leaves sparsely hairy beneath, gl. II and III puberulous.—Burma, Collett.

10. P. villosum, Lamk. Illustr. i. 173, Encycl. iv. 745; leaves ovate-oblong obtuse or acute densely pubescent on both surfaces base rounded, spikes secund erect tomentose, spikelets $\frac{1}{2} - \frac{1}{16}$ in. ellipsoid glabrous or tomentose, gl. I very short semi-lunar nerveless, II ovate acute 7-nerved, III ovate-oblong acute paleate, IV obovate abruptly apiculate minutely rugulose. Kunth Enum. Pl. i. 98; Herb. Wight n. 3053. PP. Careyanum, Nees Agrost. Bras. 118. P. coccospermum, Steud. Syn. Gram. 62; Thw. Enum. Pl. Zeyl. 359; Trim. Cat. Ceyl. Pl. 105. P. grossarium, Roxb. Fl. Ind. i. 297; Hochst. in Herb. Hohen. n. 919. P. nanum, Nees in Herb. Royle, ex Steud. l. c.; Duthie Grass. N.W. Ind. 5. P. nilagiricum, Steud. l. c. P. procumbens, β (setigerum, Roxb.) Wight Cat. n. 3053. P. repens, Roxb. Fl. Ind. i. 299. P. vestitum, Nees in Herb. Royle ex Steud. l. c.; Aitchts. Cat. Panjab. Pl. 160; Duthie Grass. N.W. Ind. 7, Fudd. Grass. N. Ind. 13.—Panicum, Wall. Cat. n. 8733 E, 8735.

Subtropical and tropical Himalaya, from the Chenab to Sikkim, alt. 3-6000 ft. Khasia Hills, alt. 2-6000 ft. Nilenier Hills. Burma, Wallich. Crylon, Gardner.—Distrib. Tonkin, China.

Annual. Habit of P. prostratum, with which it has been confounded, but is a hill plant, distinguished by its hairy leaves and much more hairy spike and spikelets.

- ++ Spikelets 10-1 in.
- § Spikelets usually close together, more or less imbricating.
- 10*. P. muticum, Forek. Fl. Aeg. Arab. 20; stout, nodes bearded,

leaves long, base subcordate, panicle deltoid glabrous, spikes alternate, rachis narrow flattened, spikelets \(\frac{1}{8} \) in. crowded ovoid acute glabrous, gl. \(I = \frac{1}{4} \) of III ovate &cute 1-nerved, II and III subequal 5-nerved, III paleate male, IV ellipsoid obtuse margins narrowly incurved. Schult. Mant. ii. 225; Kunth Enum. Pl. i. 93; Steud. Syn. Gram. 40. P. amphibium, Steud. l. c. 61; Zoll. Pl. Rar. Jav. 416. P. barbinode, Trin. Gram. Panic. 168, Sp. Gram. Ic. t. 318; Thw. Enum. Pl. Zeyl. 361; Steud. l. c. 67; Duthie Grass. N.W. Ind. 2. P. equinum, Sultzm. ex Steud. l. c. P. leiogonum, Sieb. Pl. Egypt ex.icc.; Link. Hort. Berol. i. 206; Steud. l. c. 79. P. Meyerianum, Nees Fl. Afr. Austr. i. 32; Steud. l. c. 61. P. molle, Griseb. Fl. Brit. W. Ind. 547 (excl. Syn.) non Sw.; Baker Fl. Maurit. 436; Trim. Cat. Ceyl. Pl. 105 (non Sw.). P. numidianum, Lamk. Ill. i. 122, Dict. iv. 749; Desf. Fl. Atlant. i. 60, t. 11; Trin. Sp. Gram. Ic. t. 174; Steud. l. c. 345; Doell. in Mart. Fl. Bras. ii. II. 187. P. pictiglume, Steud. b. c. 73. P. paragnayense, Steud. in Pl. Rengz (name only). P. punctulatum, Arn. ex Wight Cat. n. 2039; Steud. l. c. 62. P. purpurascens, Raddi ex Opiz. in Flora, v. (1822) 266; Nees Agrost. Bras. 240; Steud. l. c. 57. P. sarmentosum, Hassk. Pl. Jav. Rav. 17 (non Roxb.). Paspalum mollicomum, Kuhth l. c. 47; Steud. l. c. 31. Digitaria mauritiana, Wall. mss (Ic. in Herb. Kew).—Panicum, Wall. Cat. n. 8724.

BENGAL and CEYLON, in marshes, cultivated or naturalized.—DISTRIB. Java, Africa, America.

Stem ascending, 6-8 ft. high; nodes softly bearded, rarely glabrescent. Leaves 6-10 by \(\frac{1}{2}-\frac{3}{2}\) in., and shenths glabrous or hairy; ligule short; ciliate. Panicle crect, 3-5 in.; rachis stiff, scabrid. Spikes rather distant, stout, simple or divided below, lower 2-4 in., upper gradually shorter, rachis \(\frac{1}{20}\) in. broad subhispid. Spikelets turgid, sometimes solitary and alternate throughout the spike, green or purplish; gl. IV obscurely dotted or roughened.—The Water-grass of the Mauritius and Ceylon. I find gl. III to be always male, but being described as neuter by others it no doubt varies in this feapect, as do so many other Panica. It is very near the American P. molle, Sw., and is often confounded with it, and the English names given above apply to both. It is distinguished from P. moles by the glabrous panicle and 1-nerved (not 3-nerved) gl. I.

11. P. javanicum, Pow. Encycl. Suppl. iv. t. 274; pubescent or hairy, 'leaf-base rounded or cordate, spikes 6-12, spikelets 1-1 iu., biscriate alternate or upper scattered ovate acute, gl. I not = \frac{1}{2} II 3-nerved, II 7-nerved acute, III like II 5-nerved paleate. IV oblong rugulose shortly abruptly awned. Trin. Pan. Gen. 155; Baker Fl. Maurit. 434. P. Helopus, Trin. in Spring. N. Entdeck. ii. 84, Pan. Gen. 150, Sp. Gram. Ic. t. 183; Nees Agrost. Brav. 117; Steud. Syn. Gram. 7; Duthie Grass. N.W. Ind. 4, Indig. Fodd. Grass. t. 7, Fodd. Grass. N. Ind. 8 (excl. some Syns.); Benth. Fl. Austral. vii. 476 (in note). P. japonicum, error for javanicum, Kunth Revis. Gram. i. 205, in syn. P. hirsutum, Koen. ex Roxb. Fl. Ind. i. 300, & Wight Cat. n. 1620; Aitchis. Cat. Panjab. Pl. 159. P. Koenigii, Syreng. Syst. i. 311. P. papillosum, Fenzl ex Steud. l.c. 100, P. paspaloides, Herb. Heyne, ex Wall. Cat. n. 8729. P repens, Herb. Roxb. ex Wall. l.c. n. 8731 A (non Fl. Ind.). P. trichopus, Hochst. in Flora, xxvii. (1844) 254. Oplismenus? hirsutus, Schult. Mant. ii. 271. O. javanicus, Roem. & Sch. Syst. ii. 391. Helopus trichopus, Hochst. ex Steud. t.c. 100. Setaria? hirsuta, Kunth Revis. Gram. i. 47, Enum. Pl. i. 157. S. pilifera. Spreng. Syst. iv. Cur. Post. 33. Urochloa panicoides. Beauv. Agrost. 52, t. 11, f. 1; Kunth l. c. i. 205, t. 14, Enum. 74 (excl. Syn. Roxb.); Schult.

Mant. iii. 595. U. pubescens, Kunth l. l. c. 31, 74. U. mauritiana, Bojer Hort. Maurit. 363.—Panicum, Sp. Wall. Cat. n. 8729.

Plains of INDIA, from Kashmir to Bengal, and southward to CEYLON.—DISTRIB.

Tropics generally.

- Annual. Stem 1-2 ft., decumbent and rooting below, nodes pubescent. Leaves 1-5 by \(\frac{1}{2} \) in , flat or undulate, very variable in breadth and form of base, lanceolate, acuminate and loose sheath laxly hairy; ligule a beard. Spikes \(\frac{2}{2} \) in. long, secund, spreading; rachis 3-gonous, pubescent and with a few long hairs. Spikelets \(\frac{1}{2} \) in., geminate or upper solitary, usually pubescent, pale; pedicels very short; gl. I acute or obtuse; III male, palea oblong; IV rounded at the tip.—Kunth (Revis. Gram. i. 206) says, under Urochloa panicoides, that he has examined in Desfontaine's Herbarium the type of Poiret's P. javanicum, and identified it, which he cites as a syn. of Urochloa panicoides, but his figure of which again quite accords with a narrow-leaved form of P. Helopus, Trin. This requires the adoption the name javanicum (by misprint japonicum in Kunth Revis.), for the species. Bentham, on the other hand (Fl. Austral. vii. 477), says that Munro has seen an authentic specimen of javanicum, and that it is quite distinct from P. Helopus. I have no means of verifying either authority.
- 12. P. ramosum, Linn. Mant. i. 29; suberect, glabrous or pubescent, leaves amplexicaul, spikes many often crowded suberect, rachis scabrid and hairy, spikelets \(\frac{1}{10} \) \(\frac{1}{2} \) in. 1-2-seriate elliptic ovoid or obovoid glabrous or pubescent, gl. 1 = \(\frac{1}{2} \) III ovate 3-5-nerved margins overlapping, II 7-nerved, III 5-7-nerved neuter, palea narrow, IV subobovoid apiculate transversely rugulose. Kunth Enum. Pl. i. 125; Steud. Sym. Gram. 97; Wall. Cat. n. 8727 A. P. arvense, Kunth Revis. Gram. ii. 391, t. 109; Enum. Pl. i. 93; Steud. l. c. 67. P. aquariorum, Bansium & quinquangulare, Ham. ex Wall. Cat. n. 8727 C, 8725 A. B. P. canescens, Wight Cat. n. 1622 (non Roth.). P. fluitans, Herb. Heyne ex Wall. Cat. n. 8727 B. P. grossarium, Koen. in Naturf. xxiii. (1788) 205 (& Heyne & Roxb. in Herb. Banks). P. Kotschyanum, Hochst. in Flora xxv. (1842) Beibl. i. 33; Steud. l. c. 68. P. nudiglume, Hochst. l. c. xxvii. (1844) 33; Steud. l. c. P. Petiverii, Trin. Diss. ii. 144, Pan. Gen. 171, Sp. Gram. Ic. t. 176 A. B.; Kunth Enum. Pl. i. 91; Nees Agrost. Bras. 111; Steud. l. c.; Wight Cat. 1. 1622, Herb. n. 1628, in part, & n. 3226; Aitchis. Cat. Panjab Pl. 160; Duthie Grass. N.W. Ind. 6, Fodd. Grass. N. Ind. 11; Boiss. Fl. Orient. 439. P. psilopodium, Koen. ex Trin. Pan. Gen. 217. P. semivertiillatum, Wight Cat. n. 1125. P. umbrosum, Retz. Obs. iv. 16; Raxb. Fl. pd. i. 297, Ic. pict. 103, 797.—Panicum, Wall. Cat. n. 8725 A. B. 8727 A. B. C. and D. in part.

Plains of INDIA, from Scind and the N.W. Provinces to Behar and southward to

Madras.—Distrib. Affghan.

- Annual? Stem 1-3 ft., decumbent and branched below; branches erect, leafy. Leaves 3-4 by \$\frac{1}{2}\$-1 in., lanceolate, acuminate, thin, glabrous or pubescent, base rounded and usually deeply lobed, margins minutely ciliolate; sheath glabrous or pubescent, mouth usually ciliate; ligule abort. Paniole 2-6 in., inclined, oblong, glabrous or pubescent; rachis angular. Spikes 1-2 in., erecto-patent, rather distant, sometimes divided at the base. Spikelets alternate, close or distant, often in pairs a sessile and pedicelled, pale green or yellowish, turgid; pedicel usually with long cilis.—I think this is certainly P. umbrosum, Retz & Roxb.
- 13. P. setigerum, Rets. Obs. iv. 15; leaves ovate-lanceolate with long cilia towards the amplexical base margins below crenulately wrinkled, spikes alternate, pedicels with scattered long hairs, spikelets \(\frac{1}{2} \) in. biseriate alternate imbricate subsessile ovate acuminate glabrous or pubescent, gl. I

= § III obtuse 3-nerved, II ovate-lanceolate acuminate 7-nerved, III 5-nerved neuter, pales as broad acuminate, IV broadly oblong mucronate or shortly awned finely rugulose. Roxb. Fl. Ind. i. 299; Kunth Enum. Pl. 90 (excl. some Syns.); Herb. Ham. ex Wall. Cat. n. 8730 B. P. affine, Poir. Encycl. Suppl. iv. 273 (ex Kunth). P. grossarium, Roxb. Ic. Ined. t. 798 (not Fl. Ind.). P. Helopus, Trin. (hirsutum, Koen.), Wight Cat. n. 1620. P. lanceolatum, Herb. Heyne ex Wall. Cat. n. 8730 A. P. nutans, Herb. Rottl. P. prostratum, forma major, Thw. Enum. Pl. Zeyl. 359. P. prostratum, var. horizontale, Trim. Cat. Ceyl. Pl. 105. P. repens, Herb. Wight ex Wall. Cat. n. 8730 C. P. subcordatum, Herb. Wight ex Wall. Cat. 8730 D. P. Oplismenus prostratus, Edgew. in Journ. Linn. Soc. vi. (1862) 195.—Panicum, Wall. Cat. n. 8727 D, in part, 8730.

BENGAL; common. The CONCAN and SOUTH DECCAN, Rottler, &c. CETLON,

Thwaites (C.P. 8236).

Stem 2-3 ft., slender, prostrate and widely straggling below; lower internodes long; nodes rooting, tomentose. Leaves 3-5 by 1-11 in., finely acuminate, flat, margins crispedly wrinkled below, or to beyond the middle; sheath with ciliate margins; ligule a few hairs. Spikes 3-6, suberect or spreading, rather distant; angles of rachis scaberolous. Spikelets solitary or geminate, suberect, very acuminate.—It is impossible to recognize this species from Retz's description, but the name attached to three different specimens in Rottler's Herbarium leaves little doubt as to his plant. Roxburgh describes setigerum as having the stem almost woody towards the base, which is hardly the case in the specimens I have seen. Edgeworth cites P. setigerum, Roxb., for his Oplismenus prostratus, but it may well be doubted if he knew Roxburgh's plant.

Var. tomestosum, leaves 6-7 in., margins and sheaths with very long hairs, spike-

lets larger 1 in. long tomentose, awn longer.

14. P. distachyum, Linn. Mant. i. 138; slender, quite glabrous, or panicle sparsely hairy, leaves linear or lanceolate base rounded, spikes 2-4 distant spreading, spikelets \(\frac{1}{2-\frac{1}{2}}\) in. solitary subsessile 1-2-seriate ellipsoid glabrous, gl. I \(\frac{1}{2}\) il 5-7-nerved, II ovate acute 7-nerved, III 5-nerved, IV ellipsoid obscurely rugulose top rounded. Retz. Obs. iii. 17; Lamk. Ill. t. 43, f. 2; Kunth Enum. Pl. 91; Steud. Syn. Gram. 41; Wight Cat. n. 1632; Thw. Enum. Pl. Zeyl. 359; Trim. Cat. Ceyl. Pl. 104; Aitchis. Cat. Panjab. Pl. 159; Duthie Grass. N.W. Ind. 3. Indig. Fodd. Grass. t. 42, Fodd. Grass. N. Ind. 6; Benth. Fl. Austral. vii. 478. P. distachyon & marginatum, Herb. Madr. ex Wall. Cat. n. 8732 A. B. P. dimidiatum, Heyne ex Wall. Cat. n. 8732 D. P. subquadriparum, Trin. Gram. Panic. 145, Sp. Gram. Ic. t. 186; Kunth l. c. 80; Steud. l. c. 60. P. repens, Herb. Roxb. ex Wall. l. c. 8731 A. Digitaria distachya, Pers. Syn. i. 85.—Panicum, Wall. Cat. n. 8731, 8732.

Plains of India, from the Panjab to Upper Assam and Burma, and southward to Mulacca and CEYLON. GREAT COCOS Isld. (Ind. Ocean), Prais.—DISTRIB.

China, Malaya, Australia.

Stems 1-2 ft., branched, straggling and creeping below. Leaves 2-6 by \frac{1}{2} \text{ in.,} flat, margins of sheath ciliate or not, mouth hairy. Spikes 1-2\frac{1}{2} \text{ in., rarely more than 4, erect, at length spreading; rachis slender, glabrous. Spikelets variable in size, pale green; gl. I with overlapping margins below; II paleate or not, pales if present narrow, neuter.

Var. brevifolium, Wight & Arn. in Wight Cat. n. 1612 a; leaves 1-1 in., ovate-

lanceolate, spikes shorter, rachis broader, spikelets 2-seriate.—Drier places.

§§ Spikelets more or less remote.

15. P. semiverticillatum, Rottler in Ainslie, Mat. Med. Hindost. Ed. I. 219 (name only); stem stout erect branched, leaves broad base woolly, panicle large pubescent, spikes distant long alternate or whorled lax-tid., rachis slender, spikelets \(\frac{1}{2}\) in ovoid obtuse glabrous, gl. I much shorter than III verv broad obtuse 5-nerved, II obtuse 7-nerved, III 5-nerved, palea narrow hyaline, IV ovate-oblong obtuse minutely granulate. Steud. Syn. Gram. 62. P. semiverticillatum, Wight Cat. n. 3050 ?, 3051. P. Petiverii, Thw. Enum. Pl. Zeyl. 359.

SOUTH DECOAN, Coimbatore, Rottler, Wight; Anamallay Hills, Beddoine.

CEYLON, at Damboul, Gardner (C.P. 895).

Stem tall, erect, or base shortly decumbent; nodes and often internodes below them tomentose. Leaves 5-8 by \(\frac{1}{2} \) in., linear-lanceolate, finely acuminate, flat, glabrous except at the narrow base; sheath tomentose above; ligule a tuft of wool. Panicle 4-8 in., subpyramidal; \(Spikes 1-2\frac{1}{2} \) in.; rachis triquetrous, glabrous or pubescent. Spikelets pale, often solitary, upper shortly pedicelled.—Possibly a cult. form of P. ramosum. Described by Ain-lie as a grain cultivated by the poor at Coimbatore and in other grain countries. I assume it to be kottler's plant, relying on Wight, who had resided at Coimbatore. P. semiverticillatum, Herb. Rottler, from Jaffina in Ceylon is P. colonum.

16. P. remotum, Retz. Obs. iv. 17; very slender, leaves long narrow and sheaths quite glabrous, spikes few distant slender spreading, spikelets to in. distant subsolitary ellipsoid obtuse glabrous, gl. I = \frac{1}{2} \frac{1}{2} \text{III} obtuse or subscute 3-nerved, II obtuse 5-7-nerved. III 5-nerved, palea narrow, IV elliptic obtuse minutely rugulose. Kunth Enum. Pl. i. 125; Steud. Syn. Gram. 68. P. grossarium, Koen. var. Herb. Rottler. P. Petiverii, Triv. Sp. Gram. Ic. t. 176, f. C. P. relaxatum, Ness ex Steud. Nom Ed. 11. ii. 262; Wight Cat. n. 1623 a, and β depauperatum.

Orissa, Herb. Calcutt. South Deccan, Rottler; Courtaliam, Wight; Anamaliay Hills, Beddome.

Stem 1-2 ft., much branched, decumbent, flaccid. Leaves 2-4 by \(\frac{1}{2}\)-\frac{1}{2} in., finely acuminate, membranous, base quite glabrous; ligule very short, lacerate. Spikes (:-8, 2-4 in, long; rachis very slender, almost capillary, triquetrous, quite glabrous. Spikelets solitary or in distant pairs, sessile, or the upper long-pedicelled; glumes thin, pate with green nerves.—I find no difference between Nees' two vars. of relaxatum.

17. **P. Kurzii**, *Hook f.*; slender, leaves short lanceolate base cordate, margins of sheaths ciliate, spikes few very slender naked or with few hairs, spikelets $\frac{1}{10}$ in. ovoid acute glabrous, gl. $I = \frac{1}{3} - \frac{1}{2}$ III 3-5-nerved, II ovate acuminate 7-nerved, III 5-nerved, palea broad, IV elliptic-oblong minutely rugulose, tip rounded apiculate.—Panicum, *Wall. Cut.* n. 8745.

LOWER BENGAL, Wallich, Griffith; Seebpore, Kurs; Vicrampore and Ducca,

Marke. BEHAR; top of Parusuath, J. D. H.

Annual, decumbent and rooting below, flaccid. Leaves 2-3 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in, acuminate, margins crisped towards the usually ciliate base; sheath with villous margins; isgule bearded. Pasicle 2-6 in. long; spikes few, very distant, 2-3 in. long, with rarely a short branch bearing 2-3 spikelets towards the base of the lower. Spikelets pule, subsessile or pedicelled.—This Lower Bengal plant found at Seebpore close to the Calcutta Bot. Garden, should be one of Roxburgh's species, but I cannot identify it. It is very closely allied to P. remotum and altogether like that plant in habit, differing chiefly in the short leaves and the ciliate margins of the leaf-sheaths and in habitat. A doubtful specimen from Baidyanath (Santal Pergunnahs) collected by Clarke, has the narrow leaves of remotum.

18. P. latifolium, Linn. Sp. Pl. 58; stem prostrate and rooting below, leaves lanceolate acuminate base rounded or cordate, paniele lax, branches distant stout, rachis scaberulous, spikelets large \(+\frac{1}{2} \) in. very distant secund solitary or in pairs, glunes coriaceous 5-nerved, tips thickened, I = \(\frac{1}{2} \) II or longer, II and III subequal, III brodest triandrous, palea narrow, IV ovoid acuminate quite smooth. Willd. Sp. Pl. i. 350; Kunth Enum. Pl. i. 117; H. B. & K. Nov. Gen. & Sp. i. 100. P. Balbisianum, Schult. Mant. ii. 254; Steud. Syn. Gram. 76. P. grandiflorum, Trin. ex Nees Agrost. Bras. 154. P. oryzoides, Sw. Prodr. 23, Fl. Ind. Occ. i. 161; Kunth l. c. 129; Nees Agrost. Bras. 154; Steud. l. c. 80; Arduin. Animadv. ii. t. 5; Griseb. Fl. Brit. W. Ind. 547. P. Pseudo-oryzoides, Steud. l. c. 75. P. Ridleyi, Hack. in Trans. Linn. Soc. Ser. II. Bot. iii. 401 (name). P. zizanioides, H. B. K. l. c.; Steud. l. c. 75.—Punioum, Griff. Notul. iii. 31, n. 17.—Wall. Cat. n. 8706.—Gram. Virgin. &c. Moris. Hist. Pl. iii. 196, t. 8, f. 4.—Sloane Hist. Jam. i. 114, t. 71, f. 3.

BENGAL, SILHET, CACHAR, BURMA, and the MALAY PENINS.—DISTRIB. Eastern

trop. Asia and America.

Stem 6-24 in., rather stout, extensively creeping, glabrous, or nodes tomentose. Leaves 1-6 by \(\frac{1}{4}\)-\(\frac{1}{2}\) in., subdistictions, flat, glabrous; sheaths smooth; ligule short, ciliate. Passicle 1-6 in., erect, contracted; branches simple or sparingly divided, having short 3-fld. branchlets at the base; rachis stiff, angular. Spikelets turgid, very obscurely jointed on the short stiff pedicels, pale green; gls. all broadly over, their thickened tips laterally compressed, lateral nerves on each side close together; III empty or imperfectly triandrous.—The compressed thickened tips of the glumes are very characteristic.

Var. majus; stem stout 4-6 ft., internodes 4-6 in. rigid, nodes tomentose, leaves \$\frac{1}{2}\$ in. broad, margins thickened, base narrowed, panicle nearly 12 in. long.—Malay

Peninsula, at Goping, King's Collector.

Sect. IV. HYMENACHNE. (See p. 27.)

19. P. myurus, H. B. & K. Nov. Gen. & Sp. i. 98 (excl. Syn. Lamk.); stem tall stout spongy below, leaves long flat base cordate, panicle narrow very compound often interrupted, branches closely appressed, spikelets \(\frac{1}{2} \) in. erect narrowly lanceolate, gl. \(\frac{1}{2} \) \(\frac{1}{2} \) III, \(\frac{1}{2} \) in. erect narrowly lanceolate, gl. \(\frac{1}{2} \) \(\frac{1}{2} \) III, \(\frac{1}{2} \) in erect narrowly lanceolate, gl. \(\frac{1}{2} \) \(\frac{1}{2} \) III, \(\frac{1}{2} \) in erect, \(\frac{1}{2} \) in erect, \(\frac{1}{2} \) in much longer than II \(\frac{3}{2} \) -5-nerved, IV small thin lanceolate. \(Kunth Revis. Gram. i. \) 33, \(Knum. Pl. \) i. 86, \(Suppl. 65; \) Thv. \(Enum. Pl. Zeyl. 361; \) Trim. \(Cat. Ceyl. Pl. 104; \) Duthie \(Fold. Grass. N. Ind. 10 \) (excl. \(Syn.); \(Benth. Fl. Austral. \) vii. 480 (excl. \(Syn. \) interruptum)—Excl. in all \(Syn. \) Lamk. \(Rudge, Richard, Trin. \) P. acutiglumum, \(Steud. \) Syn. \(Gram. 66. \) P. auritum, \(Hasskarli. \) \(Pl. Rar. \) Jav. 22 (non \(Presl.). \) P. cynosuroides, \(Herb. Rottl. \) P. Hasskarli. \(Steud. \) in \(Zoll. \) Syst. \(Verz. 54, \) Syn. \(Gram. 70; \) \(Miq. Fl. \) Ind. \(Bat. \) iii. \(456. \) P. myurum, \(Meyer Fl. Eseq. 50 \) (excl. \(Syn. \) Lamk \(\frac{3}{2} \) \(Rudge). \(P. \) mangaloricum, \(Steud. l. c. 78. \) P. serratulum, \(Herb. Ham. in \) \(Wall. \) Cat. \(n. 8699. \)
P. serrulatum, \(Roxb. Fl. \) Ind. i. 307; \(Kunth Enum. Pl. i. 126. \) Hymenachne myuros, \(Beauv. \) Agrost. \(49, t. 10, f. 8 \) (excl. \(Syn. \) Lam.); \(Nees \) Agrost. \(Brus. 275; \) \(Griseb. Fl. \) Brit. \(W. \) Ind. 553 (excl. \(Syn.); \(Steud. l. c. \) Agrostis alopecuroides, \(Vahl. \) mss., \(& A. \) monostachys, \(Poir. Encycl. \) Suppl. i. 256, \(ex. Kunth l. c. \) -Panioum, \(Wall. \) Cat. \(n. 8699. \)

Marshes in Upper and Lower BENGAL, ASSAM, SILHET, the DECCAN, MALAYAN

PENINSULA and CEYLON.—DISTRIB. Trop. As. Austral. and Amer.

Stem erect, 2-6 ft., leafy, rooting at the nodes of the prostrate base, which is often a thick as a swan's quill. Leaves 12-18 by \frac{1}{2}-1 in., tapering from a broad cordate base to a fine point, margin serrulate; sheath smooth, glabrous; ligule very

short, rounded. Panicle 6-12 in., rarely 1 in. diam., often interrupted, sometimes quite cylindric. Spikelets erect, very shortly pedicelled, pale green; gl. I broadly ovate, acuminate; III tapering into a long rigid erect beak; palea 0 or imperfect.—Generally cited as P. myurus, of Lamk, but as Nees has pointed out (Agrost. Bras. l.—Lamk's plant is Richards' P. myosurus (= P. indicum). In Munro's herbarium P. myurus is, perhaps rightly, referred to P. amplexicaule, Rudge (Pl. Gui. i. 21), which is a much broader leaved plant.

20. P. assamioum, Hook. f.; slender, erect, leaves narrow base rounded, panicle spiciform cylindric very narrow interrupted, spikelets in densely crowded on the appressed branches, gl. I = 1 III 3-nerved, II and III lanceolate 5-nerved, III rather longer than II epaleate, IV ovatelanceolate thin smooth.

ASSAM, Masters, Griffith; DACCA, Clarke.

Stem 12-18 in. or more, ascending, as thick as a sparrow's quill, lower nodes rooting. Leaves 2-4 in., narrowed from the base to the acute tip, margins quite smooth, involute (when dry); sheath glabrous or mouth slightly hairy; ligule a narrow membrane. Panicle 3 in., hardly \(\frac{1}{2} \) in. diam., pale green, quite glabrous. Spikelets very shortly pedicelled; glumes thin.—I advance this species with hesitation. It is nearest to P. myurus, differing in size, narrow leaves, very narrow panicle, smaller spikelets, and shorter glume III.

21. P. auritum, Presl ex Nees Agrost. Bras. 176; tall, erect, leaves linear-lanceolate base broadly cordate, panicle long contracted or more or less effuse much fastigiately branched, branches erect, spikelets 1/2-1/5 in. crowded on short branchlets solitary sessile or shortly pedicelled oblong or ovate-oblong subacute, gl. I = ½ III obtuse or acute nerves 3-5 arching III and III subequal acute or acuminate 5-nerved, III paleate neuter, IV lanceolate acuminate smooth. Presl Rel. Hænk. i. 305; Trin. Pan. Gen. 176; Kunth Enum. Pl. i. 113; Steud. Syn. Gram. 70; Thw. Enum. Pl. Zeyl. 361; Trim. Cat. Ceyl. Pl. 105; Baker Fl. Maurit. 437; Miq. Fl. Ind. Bat. iii. 456. P. insulicola, Steud. l. c. 73. P. javanum, Nees & Bühse in Miq. Pl. Jungh. 376; Miq. Fl. Ind. Bat. l. c. 453. P. maximum, Wall. Cat. n. 8715 F. P. patens, Bojer Hort. Maurit. ex Baker l. c. P. secundum, Herb. Rottl. Hymenschne myurus, Herb. H.f. & T. (in part).—Panicum, Wall. Cat. n. 8701, 8707.

Marshes from BENGAL and the CONCAN to BURMA, TRAVANCORE, the MALAY

PENINSULA, and CETLON.—DISTRIB. Malaya, China, Mauritius?

Perennial. Stem 8-6 ft., sometimes as stout as a goose-quill, soft. Leaves 8-14 by \(\frac{4}{2} - 1 \) in., glabrous or sparsely hairy beneath, as is the sheath; mouth villously bearded; ligule very narrow. Panicle 8-18 in., green, rachis scaberulous, branches 2-5 in., branchets and fascicles of spikelets subsecund. Spikelets green, glabrous, nerves atrong; gl. I broadly ovate; II and III ovate-oblong; pulea of III small; IV as long as III, white, thinly coriaceous.—The Ceylon specimens have longer (\(\frac{1}{10} - \) \frac{1}{2} in.) narrower and more acuminate spikelets than the normal.

22. P. interruptum, Willd. Sp. Pl. i. 341; stem tall very stout spongy below, leaves long flat base rounded or subcordate, panicle very narrow almost reduced to a spike, spikelets (many imperfect) \(\frac{1}{4}\)-\(\frac{1}{2}\) in. fascicled very shortly pedicelled ovoid rather turgid, gl. I = \(\frac{1}{4}\) III orbicular hyaline 5-nerved, II = III ovate-oblong obtuse strongly 9-nerved, III ovate-oblong obtuse, palea small, IV much smaller lanceolate accuminate polished white. Nees Fl. Afr. Austr. 51; Kunth Enum. Pl. i. 87; Roxb. Fl. Ind. i. 286; Wall. Cat. n. 8695 Excl.C.; Thw. Enum. Pl. Zeyl. 361; Trim. Cat. Ceyl. Pl. 104; Wight Cat. n. 1640; Griff. Notul. iii. 26, Ic. Pl. Asiat.

t. 139, f. 221 & t. 146, f. 2.; Dalz. & Gibs. Bomb. Fl. 316. P. caudatum, Thunb. Fl. Cap. i. 393. P. inundatum, Kunth Revis. Gram. i. 34; Enum. Pl. i. 88. P. spiciforme, Hochet ex A. Rich. Tent. Fl. Abyss. ii. 359. P. stagninum, Herb. Ham. ex Wall. Cat. n. 8695 D (non Retz). P. turritum, Thunb. in Mus. Nat. Acad. Upsal. x. 148. P. uliginosum, Roth Nov. Pl. Sp. 50. Hymenachne interrupta, Bühse in Mig. Pl. Jungh. i. 377; Mig. Fl. Ind. Bat. iii. 458: Steud. l. c. 101.

Swamps; from the UPPER GANGETIC PLAIN to Assam and BURMA, and south-

ward to CEYLON-DISTRIB, China, Malaya, Afr. trop.

Stem 3-5 ft., lower internodes often as thick as the thumb, rooting. Leaves 6-12 by \(\frac{1}{2}\) \(\frac{1}{2}\) in., many-nerved, base hardly contracted; sheath smooth; ligule short, membranous. Spike 6-10 in. by \(\frac{1}{2}\) in. diam., strict; rachis stout, terete, channelled. Spikelets spreading, much longer than their pedicels, green, herbaccous.—Very near the American P. vilfoides, Trin. (fuviatile, Nees). Bentham reduces P. interruptum to P. myurus, but they are very different plants.

23. P. indicum, Linn. Mant. ii. 184; stem slender, leaves linear glabrous or hirsute base narrow, panicle spiciform oblong or cylindric dense fld. branches very short, spikelets longer than their pedicel 10-1 in. crowded ovoid or oblong subacute straight or curved glabrous or hispid, gl. I = about † III 3-nerved, II ovoid cymbiform obtuse or subacute 7-9-nerved, III as long as II oblong obtuse 7-9-nerved, palea minute, IV minute ovoid subacute. Retz. Obs. iii. 9; Kunth Enum. Pl. i. 133; Steud. Syn. Gram. 84; Trin. Diss. ii. 170, Pan. Gen. 84, Sp. Gram. Ic. 197; Roxb. Fl. Ind. i. 285; Thw. Enum. Pl. Zeyl. 361 (excl. CP. 909); Trim. Cat. Ceyl. Pl. 104; Benth. Fl. Hongk, 413, Fl. Austral, vii. 480; Franch. & Sav. En. Pl. Jap. ii. 163. P. augustum, Trin. Sp. Gram. Ic. t. 334; Wight Cat. n. 1642; Steud. l.c. P. arcuatum, Br. Prodr. 189; Kunth l.c. 77; Griff. Notul. iii. 39, 40, Ic. Pl. Asiat. t. 147, f. 1; Duthie Grass. N.W. Ind. 5, Fold. Grass N. Ind. 9. P. contractum, Wight & Arn. ex Nees in Herb. Wight; Steud. l. c. 84. P. conglomeratum, Herb. Rottl.; P. Linn. Mant. 324; Kunth l. c. 133. P. interruptum, Wall. Cat. n. 8695 C. partim. P. Johannæ & incurvum, Herb. Linn. ex Munro in Journ. Linn. Soc. vi. 39. P. microstachyum, Lamk. Ill. i. 170, Encycl. iv. 739; Kunth l. c. 88. P. myosurus, Rich. in Act. Soc. Hist. Nat. Par. i. (1792) 106. P. myurus, Lamk. Ill. i. 172. P. phalaroides, Roem. & Sch. Syst. ii. 452. P. phleoides, Br. ex Kunth l. c. Hymenachne indica, Bühse ex Miq. Fl. Ind. Bat. iii. 458. H. P phalaroides, Nees Agrost. 276; Steud. l. c. 202. PAira indica, Linn. Sp. Pl. Ed. 2. 94. Panicum, Wall. Cat. n. 8696 B. C. (in part) D. E. F. (in part) G. H., 8697, & 8698.

Tropical and subtropical INDIA (ascending 6000 ft. in the Himalaya) from Garwhal eastwards and southwards. CEYLON.—DISTRIB. Trop. Asia and Australia. (Mexico, an alien).

P. indicum appears to pass insensibly into P. interruptum and P. myosuroides, the former of which differs in its stouter habit, the latter in its caudiform spike and more minute rounded spikelets. Though so abundant in the Plains to the eastward of the Jumna, I have seen no specimens from the west of that river; nor from Africa. The following are the principal Indian forms, in describing which I have used the word spike in a conventional sense.

Var. indicum proper; stem 6-18 in. erect or decumbent at the base, leaves narrow, spikes $\frac{1}{2}$ in. cylindric green whitish or blue-purple, spikelets $\frac{1}{10}$ in. ovate-lanceolate acute straight or decurved glubrous or sparsely setose.—The common Plains form. P. phalaroides, Roem. & Sch. is a common state with more setose spikelets; it is P. indicum, β , Wight Cat. 1641 B.

Var. elatum; glabrous, stem 3-4 ft. stout erect. leaves 6-10 in. by \(\frac{1}{2}\) in., spike 3-6 in. rather stout, spikelets \(\frac{1}{2}\) in. erect oblong-ovate acute violet blue rarely greenish.—Khasia hills, in wet places alt. 5-6000 ft. The nearest form to \(P\). interruptum.

Var. pilosum; like var. elatum, but not so tall, more flaccid, leaves hirsute with spreading hairs.—Khasia hills, alt. 4-5000 ft.

Var. villosum; softly silkily villous, stem 1-2 ft., leaves quite erect, spike 2-6 in., spikelets 1-1 in. green or purplish ovate-oblong glabrous.—Panicum, No. 39, Herb. Ind. Or. Hook. f. & T.—Khasia hills, alt. 5-6000 ft.

Var. gracile; stem 1-2 ft. very slender simple or branched, leaves 4-6 by 1-1 in. flaccid, spikes 2-4 in. pale, spikelets 1 in. ovoid subacute glabrous spreading.

—Nepal, Kumaon, Sikkim, &c.

Var. angustum; whole plant very slender spike of very minute loosely packed spikelets $\frac{1}{10}$ in. long.—This, the *P. angustum* Trin., is a starved form,

Var. turgidum; stem 6-12 in., spike short cylindric or oblong very pale often proliferous, spikelets 1-1 in. oblong turgid setulose.—Panicum, Wall. Cat. n. 8697, 8698.—In wet places. Perhaps a diseased form.

24. P. myosuroides, Br. Prodr. 189; slender, leaves narrow, spikelets innumerable \(\frac{1}{18} - \frac{1}{12} \) in. densely crowded in an elongate cylindric curved caudiform panicle broadly obovoid or subglobose obtuse, gl. I about \(\frac{1}{3} \) III \(\frac{3}{3} \)-nerved, II very convex and III \(\frac{5}{3} - \text{nerved} \), III oblong obtuse palea minute, IV minute ovate-oblong. Kunth Enum. Pl. i. 77; Steud. Syn. Gram. 56; Benth. Fl. Austral. vii. 480 (excl. syn. angustum); Duthie Fodd. Grass. N. Ind. 11. P. arcuatum, Wight Cat. n. 1639 (non Br.). P. angustum, Wight l. c. 1642 (non Trin.); Wight Cat. n. 164. P. curvatum, Roxb. Fl. Ind. i. 286 (non Linn.); Kunth l. c. 87 (excl. syn.). P. indicum, Herb. Wight n. 3042; Thw. Enum. Pl. Zeyl. 361 (in part). P. interruptum, var. contigua. Steud. in Pl. Ind. Or. Hohen. n. 1606 (non Willd.). P. multiflorum, Roxb. Ic. Pict. ined. t. 782. P. nervosum, Herb. Heyne ex Wall. Cat. n. 8696 A.—Panicum, Wall. Cat. n. 8696 A. C. F. (in part) G.—Sporobolus, Wall. Cat. n. 3766 ex Wight. Cat. n. 1642.

Throughout the hotter parts of India from Nepal eastward to Assaw and Buema, and southward to the Malay Peninsula and Ceylon.—Distrib. China, Austral. Afric. trop.

Stem erect or shortly creeping. Leaves rarely 1 in. broad. Spiciform or rather caudiform panicle sometimes 8 inches long, tapering from base to tip, with rarely a short branch abruptly breaking out from near the base. Spikelets longer than their pedicels, green or purplish.—This is unquestionably P. myosuroides, Br., and Roxburgh's P. curvatum, but I hesitate to cite all the authors who have taken up these names, in some cases probably from forms of P. indicum. In its ordinary state it is a very distinct grass, from its elegant tail-like inflorescence and minute obtuse spikelets, but I find it impossible to separate specimens with short spikes from states of P. indicum. P. angustum, Trin., is such a state, and is referred to myosuroides by Bentham, but its larger spikelets are rather those of true indicum.

25. P. curvatum, Linn. Syst. Nat. xii. 730; stem yery slender, and narrow leaves flaccid, spikelets in a lax panicle with capillary flexuous branches, spikelets gibbously ovoid-oblong decurved, nerves very strong, gl. I minute, II cymbiform or almost galente, III shorter than II ovate, palea linear-oblong, IV minute. Wight Cat. n. 1636; Thw. Enum. Pl. 2eyl. 360; Trim. Cat. Ceyl. Pl. 105; Nees Agrost. Bras. 207, Fl. Afr. Austr. 50. P. costulatum, Bojer, mss. P. coryophorum, Kunth Revis. Grām. 93, t. 107; Enum. Pl. 88; Suppl. 66.—Panicum, Wall. Cat. n. 8742.

SOUTH DECCAN PENINSULA; Heyne, &c., Courtallam, Wight. CEYLON, Walker,

Thwaites .- DISTRIB. Madagascar, S. Africa.

Stem 6-18 in., prostrate, much branched, remotely leafy, nodes glabrons. Leaves 2-3 by \$\frac{1}{2}\$ in., tlat, sometimes sparsely hairy; sheath long, slender; ligule hardly any. Panicle 1-4 in., branches alternate, quite glabrons. Spikelets \$\frac{1}{2} - \frac{1}{2}\$ in., very strongly nerved, except gl. I, which is transversely oblong; II very strongly 11-nerved; III 3-5-nerved; IV ovoid, obtuse.—A very elegant small grass. Steudel (Syn. Gram. 85) has referred Sprengel's P. madagascarense (Syst. i. 317) to this, but Sprengel's character "glumes obsoletely nerved" is irreconcilable.

Sect. V. Breviglumæ. (See p 27.)

26. **P. canaliculatum**, Nees in Wight Cat. n. 1624; stems very sleuder flaccid branched, leaves narrow, spikelets $\frac{1}{10}-\frac{1}{3}$ in. solitary or few together clustered on distant very short branchlets along a capillary simple rachis ovate-oblong very shortly pedicelled, gls. membranous, I and II not $=\frac{1}{2}$ III broadly ovate subequal, III ovate acute paleate male, IV as long as III lanceolate acuminate thin muriculate tip minutely 2-toothed and mucronulate. Steud. Syn. Gram. 55. P. myurum, Wight ex Steud. l.c. P. stenostachyum, Thw. Enum. Pt. Zeyl. 436; Trim. Cat. Pl. Ceyl. 105. Aira interrupta, Rottl. ex Steud. Syn. Gram. 55.

Southern DECCAN PENINSULA, Wight. CEYLON; Jaffna, Herb. Rottler; Trinco-

malce, Glenie.

Quite glabrous. Stems 2-8 ft., many from a small woody branched nodulose rootstock, erect or decumbent at the base. Legves 3-10 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., thin, flat, quite smooth, nerves very slender, tips setaceous, base narrow; sheaths smooth; ligule obscure, ciliate. Spike 3-8 in., almost capillary. Spikelets solitary, binate, or in clusters of 3-6, on a very short branch, sessile or subsessile, pale, glistening; gl. I and II very broadly ovate, acute or obtuse; I 3-nerved; II rather the longest, 5-nerved; III faințly 5-7-nerved, its palea large, obtuse with broadly inflexed margins and green nerves at the smooth angles, which are faintly produced at the tips; IV very pale, dorsally flattened and channelled, 5-nerved; palea acute. Lodicules quadrately cuneate. Anthers linear. Style long, stigma short.—A very peculiar species.

27. P. nodosum, Kunth Enum. Pl. i. 97; stem creeping and rooting below, leaves linear base rounded or cordate, panicle broad rachis very slender scaberulous, branches very long filiform striate bearing remote racemose or solitary spikes of few secund elliptic-oblong acute spikelets \(\frac{1}{2}\top\frac{1}{2}\) in. long, gl. I not = \(\frac{1}{2}\) III 3-5-nerved, II rather longer than I 5-nerved, III 5-7-nerved epaleate, IV elliptic-lanceolate acute thin smooth. Steud. Syn. Gram. 59; Benth. Fl. Hongk. 412; Thw. Enum. Pl. Zeyl. 360; Trim. Cat. Ceyl. Pl. 105. P. Arnottianum, Nees in Wight Cat. n. 1611, Herb. n. 3068; Steud. l. c. P. multinode, Prest Rel. Hænk. i. 303 (non Lamk.). P. violaceum, Llanos Fragm. 42.

BRNGAL, ASSAM, and southwards to MALACCA, TRAVANCORE and CEYLON .--

DISTRIB. Malaya, Chiua.

Stems 1-2 ft., slender, leafy. Leaves 2-5 by \(\frac{1}{2}\)-\frac{1}{2} in., flat, thin, and as well as their sheaths glabrous pilose or hiratte, base ciliate; ligule very short. Panucle 4-6 in., branches 2-3 in., solitary or fascicled. Spikelets pale green, sessile or very shortly pedicelled, glabrous or slightly hairy; gl. IV. as long as III, dorsally flattened.

Sect. VI. Effusz. (See p. 27.)

- * Gl. I as long as III or nearly so. (The three following species are in no way allied.)
- 28. P. sequiglume, Hook. f.; slender, leaves linear-lanceolate base narrow, panicle ovate lax, branches lax in alternate fascicles or whorls spreading laxly few-fld. and branchlets and pedicels capillary smooth, spikelets 1½ in. solitary oblong obtuse faintly nerved, I = III oblong obtuse white nearly flat faintly 5-nerved deciduous, II broadly ovate subacute 9-nerved convex, III shorter than II oblong paleate male or neuter nerveless, IV much shorter than II stipitate broadly ovate obtuse sparkely pilose above or glabrous white.

NIIGHIEI HILLS; Goodadoor Ghats, alt. 5000 ft., in a wood, Lasson. Stem 1-2 ft., apparently geniculately ascending, smooth, purplish; nodes glabrous. Leaves 2-3 by \(\frac{1}{2}\)-\frac{1}{2}\] in., flat, green, smooth, 5-7-nerved and striate, midrib slender; base rounded or narrowly cordate; sheath purple, margin fimbriately ciliste; ligule a row of hairs. Panicle 4 in., branches in 6-8 rather distant fascicles of two or three, lowest 2\frac{1}{2}\] in. long. Spikelets very pale; gl. I very deciduous (so that the mature spikelet appears 3-glumed), but leaving a distinct scar; II more coriaceous, nerves more distinct; III and its palea sometimes very small and empty.—A very curious grass.

29. P. ovalifolium, Poir. Encycl. Suppl. iv. 279; stem slender decumbent and rooting below, leaves 1-2 in. ovate acuminate amplexicaul, panicle ovoid excessively branched, rachis branches and pedicels capillary, spikelets solitary $\gamma_{\delta-\gamma_0}$ in. ovate subacute, gl. I. nearly = III, II hemispheric pubescent or hirsute 5-nerved, III flat obtuse, palea large, IV oblong acute dorsally rounded smooth, margins narrowly inflexed. Beauv. Fl. Ovar. ii. 79, t. 110, f. 1; Kunth Enum. Pl. i. 113; Steud. Syn. Gram. 84; Benth. Fl. Hongk. 413; Thw. Enum. Pl. Zeyl. 359; Trim. Cat. Ceyl. Pl. 105; Duthie Grass. N.W. Ind. 6. P. amplexicaule, Poir. (teste Beauv.) ex Kunth l.c. P. arborescens, Linn. Sp. Pl. 59 (in part) (cf. Trim. in Journ. Linn. Soc. xxiv. 135). P. brevifolium, Roxb. Fl. Ind. i. 306, & Herb. Linn. P. guineense, Desv. mss. ex Poir, Encycl. Suppl. iv. 279. P. tricarinatum, Steud. Nom. Ed. II ii. 264, Syp. Gram. 94. Isachne tricarinata, Roth Nov. Sp. 57; Kunth Enum. Pl. i. 136.—Panicum, Wall. Cat. 8737.

Sikkim Himalaya, alt. 4000 ft.; Khasia Hills, alt. 2000 ft.; Munnepore, Buema, the Malay Peninsula and Ceylon.—Distrib. Malaya, China, trop. Afr.

Stem geniculate and ascending below, leafy usually up to the panicle. Leaves membranous and sheaths glabrous ciliate or hairy above or all over; ligule very short, ciliate. Panicle ovoid. Spikelets variable in size; gl. II very persistent.— Resembles Spharocaryum elegans and often mixed with in Herbaria. As Trimen has pointed out (Journ. Linn. Soc. l. c.) this, according to Herb. Linn. & Fl. Zeyl. is P. arborescens, Linn., described as being as high as the loftiest trees. This error has no doubt originated from its having been accidentally assorted with an Arundinaria in Herb. Linn.

30. P. turgidum, Forsk. Fl. Æg. Arab. 18; shrabby, rootstock very stout creeping, stem woody, branches alternately or proliferously fascicled at the sheathed nodes, leaves short rigid, panicle erect glabrous branches solitary distant simple or sparingly divided, spikelets solitary 1/6-\$\frac{1}{2}\$ in. subglobose pale, gls. coriaceous cymbiform, I \(\pm\) III or nearly so orbicular 5-7-nerved, II broadly ovate acute 7-nerved, III acumi-

nate 9-nerved paleate male, IV small ovoid acute quite smooth polished. Del. Fl. Egypt. Ill. 51, t. 9, f. 2; Nees Agrost. Bras. i. 172 (in note); Trin. Pan. Gen. 221, Sp. Gram. Ic. t. 227; Kunth Enum. Pl. i. 97; Steud. Syn. Gram. 88; Duthie Fodd. Grass. N. Ind. 13.

SIND and CENTRAL INDIA, Duthie l. c.—DISTEIB. Beluchistan and westward to Egypt.

Rootstock sometimes as thick as the little finger, root fibres strong woolly; branches 2-4 ft., hard, solid, smooth, sometimes as thick as a goose-quill, clothed at the base with imbricating scarious scales, and the nodes higher up with long scarious leaf sheaths, branches sometimes forming dense subglobose fascicles at the nodes 2-3 in. diam., with many short reduced panicles. Leaves at the base of the stom 2-3 in. long, flat, coriaceous linear-lanceolate, acuminate, smooth, at the upper nodes reduced to brown chartaceous open sheaths with a deciduous setiform blade, ligule a row of short hairs. Panicles very variable, 1-5 in. long; rachis and branches slender, subscaberulous; pedicels short, tips cupular. Spikelats subsecund, young ovate-lanceolate acute, mature turgid; palea of gl. III broad with ciliate keels; of IV coriaceous like the gl. and shining. Anthers purple. Styles short, stigmas short, primrose-purple. — A remarkable grass, intermediate between Brachiaria and Effuse allied to no other Indian, with something of the habit of Spinifes. Duthie is my authority for the Indian habitats of this fine species; that of Sind is natural, the Central Indian I doubt exceedingly. As a species it is unmistakable. I should be disposed to refer it to the Brachiaria section, but Trinius places it under his section Militaria, which answers to Effuse.

- ** Gl. I much shorter than III.
- † Annual erect leafy grasses.

Cultivated or naturalized (Wild?) throughout the hotter parts of INDIA, AFRICA, and other hot countries.

Annual; stems tufted, 2-4 ft., stout, branching, leafy up to the paniole, often as thick as the little finger below. Leaves 6-12 by \(\frac{1}{2}\)-1 in., glabrous ciliate or hirsute, base narrow, margin scabrid often ciliate; sheaths lax, deeply grooved, clothed with very long spreading or reflexed hairs; ligule of long hairs. Paniole 6-12 in., branches filiform, fascicled, densely crowded, scaberulous; pedicelor much longer than the spikelets, but sometimes much shorter. Spikelets green, erect, turgid; gl. IV pale, sometimes dorsally 5-streaked.—Closely allied to P. miliare and P. psilopodium with which it possibly hybridizes, but with much larger spikelets. I am

far from satisfied that I have not erred in the synonyms cited for these three species, which are almost inextricably mixed. For a learned discussion on the Millet, the cultivation of which in Europe dates from prehistoric times, see A. de Candolle's "Origine de Plautes Cultivés," p. 302. Munro has attached the following to a specimen from Bombay (Woodrow, No. 89), "I believe this to be an uncultivated form of P. miliaceum"—It has spinulosely toothed scabrid leaves, and a perfectly erect panicle with very long erect branches, and few spikelets.

32: P. miltare, Lamk. Ill. Gen. 173; leaves linear hairy base rounded. panicle contracted or thyrsiform much branched erect or nodding, branches slender erect alternate, spikelets $\frac{1}{10} - \frac{1}{8}$ in. solitary or geminate usually shorter than their pedicels turgidly ovoid or ellipsoid acute, gl. I = 1 III broadly ovate acute 3-5-nerved, nerves arching, II ovate-lanceolate 11-13-nerved, III 9-nerved paleate neuter, IV from oblong to broadly ovate acute shining often 3-5-streaked dorsally. Rottl. in Neue Schrift. Ges. Naturf. Berol. iv. (1803) 83: Roxb. Fl. Ind. i. 309; Wall. Cat. 8712 C. in part, F. G. H. I.; Wight Cat. n. 1629; Kunth Enum. Pl. i. 104; Trim. Cat. Ceyl. Pl. 105; Aitchis. Cat. Panjab Pl. 159; Nees Fl. Afr. Austr. 40: Duthie Grass. N. W. Ind. 5, Field. & Gard. Crops. 7, t. 26, Indig. Fodd. Grass. t. 46, Fodd. Grass. N. Ind. 10. P. attenuatum, Willd. Enum. Hort. Berol. 1033; Nees Agrost. Bras. 173; Tvin. Diss. ii. 226. P. brevifolium, Balb. ex Nees Fl. Afr. Austr. 40. P. Menieri, Koen. ex Nees l. c. P. miliaceum, Thw. Enum. Pl. Zeyl. 360. P. miliaceum, var. Rottl. in Neue Schrift. l.c. P. musciparum, Herb. Linn. ex Munro in Journ. Linn. Soc. vi. (1862) 39. P. psilopodium, Wight Cat. n. 1633n. P. simplex, Rottl. ex Trin. Gram. Panic. 216; Steud. Syn. Gram. 67. sumatrense, Roth Nov. Sp. 50; Kunth l. c.—Panicum, Wall. Cat. n. 8718 B. 8720.

Cultivated or naturalized (or native?) throughout INDIA and CEYLON.—DISTRIB.

Tropics cult.

Annual. Stem 1-3 ft., rather slender, erect or base geniculate, simple or branched, usually leafy up to the panicle. Leaves 1-2 ft. by 1-1 in., flat, and sheaths rarely hirsute with tubercle-based hairs, acute or acuminate; ligule a narrow row of hairs. Panicle 2-10 in., lower branches long, pedicels of spikelets sometimes 1 in. Spikelets glabrous, rather flattened, usually green or purplish; gl. I variable, white, membranous, margins overlapping at the base, nerves arching and anastomosing; II and III herbaceous; palea of III as long as its gl.—If I remember aright P. miliare was conjectured by Munro to be a cultivated form of P. psilopodium; and except in the greater size, more contracted panicle, rather larger spikelets and usually shorter pedicels of P. miliare I fail to find characters whereby to separate them, and these are not very reliable. In its common state the grain of miliare is broader than in any form of psilopodium and much darker colrd. P. simplex, Rottl. is a weak flaccid form from Tranquebar, growing in shade. Trinius distinguishes it from P. psilopodium, by the scabrid pedicels of the spikelets, but they are quite glabrous in Rottler's specimen of simplex. I am not at all satisfied that I have rightly identified the synonymy of this and P. psilopodium.

Var. hirtum; upper leaf-shesths with long spreading hairs. P. hirtum, Wall. mss. in Herb. Linn. Soc. Panicum, Wall. Cat. n. 8718 (in part).—Burma, Wallich.—Wullich's sheet has three different looking plants; viz. 8718 A, from Malloon, with the panicle of psilopodium, and hiraute sheaths; B from the banks of the Irawaddy with hirsute sheaths and the panicle of miliare; along with these is a plant with a similar panicle to the last but with glabrous sheaths.

33. **P. psilopodium**, Trin. Gram. Panic. 217; leaves narrow glabrous base rounded, panicle effuse branches capillary at length spreading, spikelets $\frac{1}{12} - \frac{1}{12}$ in. geminate ovate-lanceolate acute, pedicels capillary usually

longer than the spikelets, gl. I = $\frac{1}{2}$ III or less broader than long 3-5-nerved tip obtuse or rounded, II ovate acuminate 11-nerved, III as long as II 9-nerved paleate neuter, IV oblong obtuse apiculate. Nees Agrost. Bras. 199; Kunth Enum. Pl. i. 100; Steud. Syn. Gram. 83; Thwaites Enum. Pl. Zeyl. 360; Trim. Cat. Ceyl. Pl. 105; Aitchis. Cat. Panjab. Pl. 161; Duthie Grass. N. W. Ind. 6, Field & Gard. Crops. i. t. 23, Fodd. Grass. N. Ind. 10 (in note). P. Chintaman, Herb. Hum. ex Wall. Cat. 8712 D. P. glabrum, Herb. Heyne ex Wall. Cat. n. 8712 C (in part). P. miliare, var. Meneri, Herb. Mudr. ex Wall. Cat. n. 8712 B. P. miliare, Wall. Cat. n. 8712 A (in part) B (in part) D. P. mucronatum, Wall. Cat. n. 8717 (in part). P. ramosum, Koen. ex Herb. Banks. P. Royleanum, Nees ex Duthie Grass. N.W. Ind. 6. P. virgatum, Royle. mss. ex Steud. Nom. Ed. II ii. 265.—Isachne, Wall. Cat. 8659 B (in part).

Hotter parts of INDIA, ascending to 4000 ft., BURMA; MALACCA and CEYLON. Annual. Stem 1-2 ft., rather slender, simple or branched, usually leafy up to the panicle. Leaves 3-12 by 1-1 in., flat, acute or acuminate, usually glabrous; sheaths glabrous or hirsute, mouth with a few hairs; ligule a narrow row of hairs, Panicle 2-8 in.; lower branches long; pedicels sometimes \(\frac{1}{2}\) in. long. Spikelets rather flattened, dorsally green or purplish; gl. I variable, membranous, white, margins overlapping at the base, nerves 3-5 anastomosing; II and III herbaceous, palea of III as long as the gl.; IV shining-Necs (Agrost. Bras.) describes gl. II as 7-nerved probably by error. Diseased states occur with gl. 1V enlarged exserted flattened. Trinius describes the spikelets as elliptic and mucronate, and the panicle as contracted below and lax above, but this latter is a matter of development. Trinius gives as a character of P. psilopodium glumes open, which is a conspicuous one in P. trypheron, but I do not recognize it in this. He further says that he has seen this species in Herb. Lindley under the names of P. ramosum. Koen, and P. virgatum, Roxb. I have in vain tried to verify this in Lindley's Herb., and conclude that for Herb. Lindley Herb. Mus. Brit. is intended. Duthie, Fodd. Grass. N. Ind. 10 (in note) says that he is unable to distinguish P. psilopodium from P. miliars. Dr. Stapf who has carefully reviewed a multitude of specimens of P. miliare and psilopodium, is disposed to think them separable, though the former is probably a cult, form of the latter. The true psilopolium he thinks has nearly always glabrous leaves, smaller spikelets and a shorter gl. I.

Var. coloratum; panicle violet or purple.—Simla and Garwhal, up to 6000 ft.,

Mt. Abu, Duthie; Shan Hills, Burma, Collett.

34. **P. trypheron**, Schult. Mant. ii. 244; leaves narrow, panicle effuse, branches long stiff filiform divaricate scaberulous, spikelets γ₀-1 in. often geminate, pedicels capillary, gls. divergent strongly nerved I, II and III broadly ovate, I = ½ III or longer acuminate 5-nerved, II and III subequal recurved subcuspidate 9-nerved, III paleate neuter, IV broadly oblong obtuse shining often 5-nerved. P. coloratum, β hirsutum, Nees in Herb. Lindl. (ex Steud.). P. confine, Hochst. in Schimp. Pl. Abyss. in. 1230; A. Rich. Tent. Fl. Abyss. ii. 373; Steud. Syn. Gram. 72. P. jumentorum, A. Rich. l. c. 373 (non Pers.). P. miliare, Wall. Cat. n. 8712 A (in part) E. P. miliare, β simplex, Herb. Royle. P. mucronatum, Heyne in Wall. Cat. n. 8717 (in part). PP. notatum, Duthie Grass. N.W. Ind. 6. P. Neesianum, Wight § Arn. ex Steud. l. c. 74. P. porphyrhizos, Steud. l. c. P. rigidum, Herb. Heyne ex Wull. Cat. n. 8714 A (in part). P. Roxburghii, Spreng. Syst. i. 320; Kunth Enwim. Pl. i. 126; Steud. l. c. 98. P. teuellum, Roxb. Fl. Ind. i. 306; Duthie l.c. 7.—Panicum, Wall. Cat. n. 8713, 8714 A (in part).

The Panjab and Gangetic Plain to Chittagong and southward to Madras. Kumaon, up to 5000 ft.—Distrib. China, Borneo, Afr. trop.

Annual. Stem 6 in. 3 ft., tufted, erect or geniculate below, leafy chiefly near the base; nodes rarely rooting. Leaves 3-10 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., usually flat, thin, acuminate, glabrous hairy or hirsute on both surfaces or beneath only; ligule short, fimbriate. Panicle 4-10 in., erect, often as broad as long. Spikelets green, yellow or purplish; gl. IV. variable in breadth, and in colouring, from pure white to greenishbrown, surface darker dorsal stripes.—Nees Fl. Afr. Austr. 51 has referred P. trypheron, Sch. to P. curvatum, L., a very different plant, and not a native of Bengal.

35. P. humile, Nees ex Steud. Syn. Gram. 84; dwarf, slender, leaves very narrow glabrous base narrow, panicle broad effuse lax-fid., branches subsolitary long spreading naked few-fid., branchlets capillary, spikelets \mathbf{r}_{15} in. pedicelled ovate acute glabrous, gl. I = $\frac{2}{3}$ III broadly ovate acuminate 3-nerved, III longest ovate-lanceolate acuminate 3-nerved, III ovate acute 3-5-nerved paleate neuter, IV much shorter broadly oblong obtuse pale shuning. Thw. Enum. Pl. Zeyl. 360 (CP. 3243); Trim. Cat. Ceyl. Pl. 105; Duthie Grass. N.W Ind. 4, Fodd. Grass. N. Ind. 9. P. tenellum, Griff. Notul. iv. 21, Ic. Pl. Asiat. t. 139, f. 194 (non Roxb.).

The Panjab. Thomson; Bengal, Assam, Sikkim, Arracan, and southward to Crylon,—Distrib, Borneo.

Annual. Stem 2-24 in., erect or geniculate below, much branched and often flowering from the base. Leaves 2-8 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., flat, base hardly cordate; sheath glabrous, or mouth sparsely hairy. Panicle 1-3 in., often as long as the whole plant, very laxly and diffusely branched. Spikelets minute, pale or reddish.

36. P. hydaspicum, Edgew. in Journ. Linn. Soc. vi. (1862) 207; dwarf, leaves linear-lanceolate hirsute base narrow, panicle effuse much branched glabrous, branches erecto-patent alternate rarely opposite and branchlets and pedicels filiform, spikelets $\frac{1}{3^3-1^3}$ in. equalling or shorter than their pedicels solitary ovate acute glabrous, gls. membranous, nerves strong, $I = \frac{2}{3}$ III ovate acuminate 5-nerved, II and III subequal ovate subacute 5-7-nerved, III paleate, IV elliptic obtuse brown shining. Aitchis. Cat. Panjab. Pl. 159; Duthie Grass. N.W. Ind. 4. P. humile, Aitchis. l. c.

The Panjab and Upper Gangerio Plain; from the Ravee to the Indus.

Edgeworth, &c. CENTRAL PROVINCES, Duthie.

Annual. Stem 6-18 in., geniculately ascending, rather stout below, branching from the very base. Leaves and sheaths clothed more or less thickly with long white hairs; sheaths inflated in some states. Leaves 1-2 by 1-1 in., flat, soft, acute; ligule a row of hairs. Panicle 2-4 in., peduncled, erect, ovoid rachis, and branches quite smooth, hardly flexuous. Spikelets pale green, except the dark brown gl. IV; pales of III smaller than the gl., oblong

37 **P.** cossium, Nees in Hook. Kew Journ. ii. (1850) 97; erect, stout, hairy, leaves linear base narrow subcordate, panicle large erect subthyrsiform much branched, branches suberect lower fascicled, spikelets $\frac{1}{12} - \frac{1}{10}$ in. subsessile except the terminal broadly ovoid turgid nerves anastomosing, gl. I = $\frac{1}{4} - \frac{1}{8}$ III ovate obtuse 5-nerved, II and III subequal ovate acute 7-9-nerved, palea linear, IV = II elliptic-ovate obtuse pale smooth shining. P. reticulatum, Thu. ex Trimen Cat. Ceyl. Pl. 105 (non Griseb.).—Panicum, Wall. Cat. n. 8744.

BENGAL, in the Jheels, J. D. H. & T. T. CACHAR, Keenan. MALACCA, Griffith. NICOBAR ISLDS., Kurz. CRYLON; Pasdoon Corl, Thwaites (CP. 3890).—DISTRIB. Borneo, N. Guinea, Philippines.

Annual. Stems 2-3 ft., densely tusted, erect from the root. Leaves 6-10 by \{-\frac{1}{4}\} in., flat, soft, and sheaths more or less densely clothed with soft white spreading hairs; ligule a ridge of hairs. Panicle 10-18 in. long; branches angular, scaberulous. Spikelets solitary or geminate, red-brown. Glumes rather soft; II deciduous; IV pale yellow or brownish, sessile, margins narrowly incurved.—The Borneau and Philippine specimens are more slender and less hairy than the Indian.

tt Perennials.

- § Glume I very small, suborbicular, white, nerveless; (0 in P. sube-glume); III 3-9-nerved, paleate or not.—Spikelets usually very shortly pedicelled.
- 36.* P. maximum, Jacq. Ic. Pl. Rar. i. t. 13; Coll. i. 76; tall, stout, erect, leafy, leaves long broadly linear or linear-lanceolate glabrous, panicle large decompound, lower branches whorled usually hairy, pedicels unequal capillary, spikelets 10-14 in. solitary or in pairs elliptic-oblong acute or obtuse glabrous, gl. I = 1 III white 0-3-nerved, II and III subequal 3-7-nerved, III paleate male, IV elliptic subacute transversely rugulose. Sw. Fl. Ind. Occ. i. 170; Nees Agrost. Bras. 166, Fl. Afr Austr. 36; Trin. Gram. Panic, 221; Pan. Gen. 180; Steud. Syn. Gram. 72; Wall. Cal. n. 8715 A. B (in part) D.; Trim. Cat. Ceyl. Pl. 105; Aitchis. Cat. Panjab Pl. 159; Griseb. Fl. Brit. W. Ind. 549; Baker Fl. Maurit. 436; Boiss. Fl. Orient. v. 439. P. altissimum, Brouss. Elench. Hort. Monsp. (1805) 42; Dalz. & Gibs. Bomb. Fl. Suppl. 98. P. confusum, Trin. ex Steud. Nom. Ed. II ii. 254. P. eburueum, Trin. Pan. Gen. 180; Steud. Syn. Gram. 73. P. Equisetum, Nees, ex Doell in Mart. Fl. Bras. ii. II, 206. P. fasciculatum, "Pl. Carib. non Sw.," Griseb. Fl. Brit. W. Ind. 549. P. gongylodes, Jacq. Eclog. Gram. 30, t. 21. P. jumentorum, Pers. Syn. i. 83; H. B. & K. Nov. Gen. & Sp. i. 104; Thw. Enum. Pl. Zeyl. 361: Duthie Grass. N.W. Ind. 5, Fodd. Grass. N. Ind. 9. P. læve, Lamk. Ill. i. 172. P. longipes, Wight & Arn. in Wight Cat. n. 1638. P. megiston, Schult. Munt. ii. 248. P. pamplemoussense, Stewl. l. c. 71. P. polygamum, Sw. Prodr. Veg. Ind. Occ. 24. P. praticolum, Saltzm. ex Doell in Mart. Fl. Bras. ii. II. 203. P. trichocondylum, Steud. l. c. 74. P. tuberculatum. Presl Rel. Hænk. i. 307.

Cultivated in many parts of India.—Native of Africa.

Perennial? 8-10 ft. high; stem branching, branches erect, nodes naked or bearded. Leaves 1-2 ft. by 1-1 in., gradually narrowed from a small rounded or auricled base to a long filiform point, quite smooth, nearly glabrous; sheaths long, mouth villous; ligule of long hairs. Panicle 1-2 ft., quite erect, branches erect, filiform, smooth; pedicels usually shorter than the spikelets, glabrous or very sparsely pubescent, bright green, glistening, gl. thin.—This grass is described both as an annual and a perennial. Trinius' description of P. eburneum I think refers it to maximum; it is described as from Nepal.

Var. β, Boiss. l. c.; spikelets shortly hajry, gl. III neuter.—Peshawur, Aitchison. Affghan.—Apparently a smaller plant than typical P. maximum.

37. P. repens, Linn. Sp. Pl. Ed. 2, 87; stem creeping and stoloniferous below, leaves distichous linear-lanceolate flat or convolute glaucous, panicle usually contracted irregularly branched, branches 2-3-nate strict, spikelets 15 in. sessile or shortly pedicelled ovate-lanceolate acute white, gl. I = 1111 orbicular, II and III subequal ovate acute sub-5-nerved, III paleate or not male or neuter, IV ovate acute smooth. Sibth. Fl. Gree. i. t. 61; Ness Agrost. Bras. 171: Kunth Enum. Pl. i. 103: Trim. Cat. Ceyl. Pl. 105;

Aitchis. Cat. Punjab Pl. 160; Duthie Grass. N.W. Ind. 6, Fodd. Grass. N. Ind. 11; Boiss. Fl. Orient. vii. 440; Benth. Fl. Hongk. 412. P. airoides, Br. Prodr. 190; Kunth l. c. 122. P. aquaticum, A. Rich. Tent. Fl. Abyss. ii. 373. P. arenarium, Brot. Fl. Lusit. i. 82, Phyt. Lusit. i. 15, t. 6; Nees Agrost. Bras. i. 170, Fl. Afr. Austr. 37; Trin. Pan. Gen. 181. P. coloratum, Cav. Ic. ii. 6, t. 110. P. convolutum, Beauv. ex Spreng. Syst. i. 319. P. hygrocharis, Steud. l. c. 72. P ischemoides, Retz. Obn. iv. 17; Rottl. in New Schrift iv. (1803) 185; Steud. l. c. 98; Wight Cat. n. 1627; Wall. Cat. n. 8710. P. multinode, Lamk. Encycl. iv. 747 (ex Nees Agrost. Bras.). P. paludosum, Hochst. ex Steud. l. c. 72 (not of Roxb.). P. polystachion, Ucria, Hort. Reg. Panorm. 54. P. psilopodium, Trin. ex Wight Cat. n. 1633 C.; Herb. Strach. & Winterb. No. 5. P. Rexburgianum, Schult. Mant. ii. 245. P. sarmentosum, Hb. Wight ex Wall. Cat. 8710 C. P. uliginosum, Roxb. Fl. Ind. i. 308; Wall. Cat. n. 8710 A; Kunth l. c. 126.—Panicum, Wall. Cat. n. 8714 E, 8746.

Throughout India, by banks of streams and in dry places, from the Panjab eastwards and southwards. Ceylon, Walker, Gardner. — Distrib. S. Europe, Asia, Afr., Amer.

Stems 2-6 ft., erect or ascending from a stout creeping rootstock, leafy, simple or branched below, nodes rooting. Leaves 3-6 in., strict, often glaucous, usually narrow and involute, smooth, glabrous or hairy on the upper surface, margins sometimes toothed towards the ciliate rounded base; sheaths with ciliate margins; ligule a narrow coriaceous ring. Panicle 3-8 in., branches usually erect, very sleuder, angular, scaberulous; pedicels short, tip cupular. Spikelets erect, quite glabrous; gl. I membranous, nerveless or 3-nerved; palea of III truncate; IV shortly broadly stipitate, pale. Anthers red.—Roxburgh distinguishes his P. uliginosum from P. paludosum (proliferum, Lamk.) by the tetragonous smooth brunches of the panicle, whereas in P. paludosum these are trigonous with acute hispid angles. I have seen no authentic specimens of his P. uliginosum, but his figure of "Gundru" (the native name which he gives for it) does not show this character of the panicle.

38. P. proliferum, Lam. Encycl. iv. 747; stem erect from a floating base, leaves linear or ensiform acute serrulate usually flat, panicle with long virgate spreading branches bearing short few-fld. branchlets and solitary sessile or shortly pedicelled spikelets which lie parallel to the branchlet, spikelets \(\frac{1}{2}\)-\frac{1}{2}\] in. lanceolate, gl. I = \(\frac{1}{2}\)-\frac{1}{2}\] III orbicular, II ovate acuminate 9-nerved, III lanceolate 9-nerved paleate or not, IV oblong acuminate smooth. Nees Agrost. Bras. 170; Kunth Enum Pl. i. 100; Steud. Syn. Gram. 71; Muell. Fragment. viii. 191 (the King's Creek plant). P. aurantiacum, Ham. ex Wall. Cat. n. 8714 B. P. gongylodes, Jacq. Eclog. Gram. iii. t. 21. PP. decompositum, Duthie Grass. N.W. Ind. 3. P. decompositum, var. paludosum, Trim. Cat. Ceyl. Pl. 105. P. elephantipes, Nees Agrost. Bras. 165. P. Elliottii, Trin. ex Nees l. c. 170. P. fistulosum, Hochst. ex Steud. l. c. 71. P. natans, Koen. ex Trin. Panic. Gen. 237. P. paludosum. Roxb. Fl. Ind. i. 307; Wall. Cat. n. 8711; Nees Fl. Afr. Austr. 35; Kunth l. c. 126; Griff. Notul. 37, Ic. Pl. Asiat. t. 139, f. 127; Duthie Ford. Grass. N. Ind. 11. P. repens, Thw. Enum. Pl. Zeyl. 360; Trim. Cat. Ceyl. Pl. 105; Trin. Pan. Gen. 179. P. rigidum, Heyne in Herb. Rottl.—Panicum, Wall. Cat. n. 8714A. (in part) B. C. D.

Marshes and still waters throughout the low countries of INDIA, from the Panjab to Assam and southward. CEYLON.—DISTRIB. Tropics generally.

Perennial. Stem 2-3 ft. or more; lower nodes spongy, as thick as the little finger. Leaves 6-12 by \(\frac{1}{4-3}\) in., base broad but hardly cordate; sheaths loose;

ligule a ridge of hairs. Panicle 6-10 in., often nearly as broad, lower branches whorled and fascicled, trigonous, scaberulous. Spitelets green, variable in size, terete, palea of gl. IIF 0, or minute, or linear, neuter or male rarely bisexual.—Closely allied to (if not a more luxuriant aquatic form of) P. repens, and confused with it as to synonymy; but a coarser plant, with a more spreading panicle, more acuminate spikelets and a more oblong gl. IV. Further, P. repens has normally shorter glaucous narrower convolute leaves, and a more irregularly branched panicle. Also very near the Australian P. decompositum, Br., which has normally a decompound panicle with more slender spreading branches and branchlets, and distant solitary spikelets.

Dr. Stapf has made for me a careful analysis of the spikelets of a large series of specimens, and I have made many myself, with the view of testing the value of the absence or presence of the palea in gl. III, and its sexuality. As examples he finds in 9 spikelets taken promiscuously 3 epaleate and 6 with reduced paleas. In 5 others all are paleate and male, in 3 others all paleate but neuter. In 9 others all epaleate. In a branch with 10 spikelets, 9 of them had gl. III paleate, 1 epaleate. Of 6 spikelets from near the base of a branch, 3 epaleate, 2 male with a rudimentary ovary, 3 palente and female. Of 8 spikelets from a branch in the lower part of a panicle, 2 lowest epaleate, 6 paleate and bisexual.

39. P. subeglume, Trin. Pan. Gen. 204; stem slender, leaves linear, base narrowed, panicle large effuse, rachis and branches flexuous capillary, spikelets $\frac{1}{12}$ in. pedicelled elliptic-oblong subacute, gl. I and II absent, III and IV equal, III 5-7-nerved glabrous or silky, IV elliptic-oblong or lanceolate cuspidate. Steud. Syn. Gram. 84. P. arcuatum, Br. ex Nees in Wight Cat. n. 1639 (non Br. Prodr.). P. Brownianum, Wight & Arn. ex Steud. l. c. 98. P. Torreyanum, Wight et Arn. ex Steud. Nom. Ed. II, ii. 264; Wight Cat. n. 1634. Milium capillare, Roth Nov. Sp. 39; Kunth Enum. Pl. i. 67. M. tomentosum, Koen. ex Rottl. in Ges. Naturf. Fr. Neue Schr. iv. (1803) 220; Steud. Syn. Gram. 34; Kunth l. c. 66.— Isachne P Wall. Cat. n. 8659.

SOUTHERN DECCAN, Heyne; Madura, Rottler; Palaveram, Wight.

Perennial. Stem 1-2 ft., soft. Leaves 3-6 by \(\frac{1}{2} \) in. or less, finely acuminate, and sheaths glabrous softly hairy or tomentose; ligule short, membranous. Panicle 3-7 in., spreading, glabrous; lower branches suberect, alternate, divided from the base. Spikelets much shorter than their pedicels, erect, dorsally compressed. Grain linear-oblong, obtuse.—The absence of gl. I and II are characters of Paspalum, but the habit and inflorescence are those of a Panicum.

- §§ Gl. $I = \frac{1}{3}$ to $\frac{3}{2}$ III, 5-7-nerved.
- a Spikelets acute or acuminate. (See also P. auritum.)
- 40. P. incisum, Munro ex Clarke in Journ. Linn. Soc. xxv. (1890) 84, t. 33; stem slender, leaves long linear-lanceolate base narrow, panicle effuse very lax, rachis branches and pedicels very slender subscaberulous, pedicels very long, spikelets \(\frac{1}{4}\) in. remote solitary elliptic acuminate, gl. I about = \(\frac{3}{4}\) III ovate acute 1-3-nerved, II and III subequal, II 5-nerved, III 7-nerved, palea short, IV elliptic acuminate quite smooth polished margin narrowly inflexed. Munro Cat. Pl. Griffith, &c., ined. p. 56:

UPPER Assam; Naga hills, Griffith; Nambre forest, alt. 400 ft., Clarke.

Perennial. Stem 1-2 ft., quite glabrous. Leaves 5-10 by \(\frac{1}{2}\)-\frac{1}{2} in., finely acuminate; ligule elongate-oblong, scarious. Panicle 3-6 in., usually sessile as it were on the upper leaf sheath. Spikelets many times shorter than their pedicels, obscurely articulate at the base; glumes distant on a distinct inarticulate racheola; Il fugacious; IV rather shorter than II, brown.—Altosether resembles an Isachne in habit,

and in the spikelet being obscurely jointed on the pedicel. A very closely allied plant collected by Reddome in the Anamaliay hills has a much broader rounded and cordate leaf-base, the spikelets are too immature for description.

41. P. antidotale, Retz. Obs. iv. 17; tall, glabrous, branching, leaves linear flat base rounded, paniele large effuse or contracted, branches slender glabrous lower fascicled divided from the base, spikelets $\frac{1}{10}$ in. shortly pedicelled solitary or clustered ovoid acute, gl. I and II with broad membranous margins, $I = \frac{1}{2}$ III broadly ovate acute 5-nerved, II and III subequal strongly 5-7-nerved, II obtuse, III paleate, IV ovate oblong soute smooth. Trin. Gram. Pan. 227, Pan. Gen. 195; Nees Agrost. Bras. 201; Kunth Enum. Pl. i. 125; Steud. Syn. Gram. 77; Wight Cat. n. 1630; Thw. Enum. Pl. Zeyl. 360; Trim. Cat. Ceyl. Pl. 105; Aitchis. Cat. Panjab Pl. 158; Duthie Grass. N.W. Ind. 2, Indig. Fodd. Grass. t. 3, Fodd. Grass. N. Ind. 4; Benth. Fl. Austral. vii. 483; Boiss. Fl. Orient. v. 440. P. maximum, Wall. Cat. n. 8715 B (in part) C (in part). P. polygamum, Herb. Madr. ex Wight Cat. n. 1630. P. pruinosum, Barnh. ex Trin. Pan. Gen. 191. P. subalbidum. Kunth Revis. Gram. ii. 397, t. 112, Enum. 101. P. tenne, Roxb. ex Wight Cat. (sub n. 1628 non Fl. Ind.). Milium arundinaceum, Koen. ex Wight Cat. l. c.

The PANJAB and UPPER GANGETIC plain, and southward to the S. DECCAN and

CEYLON .- DISTRIB. Affghan., Afric., trop. Austral.

Perennial, sometimes shrubby, with a stout creeping rootstock bearing villously sheathed stolons; branches as thick as a crow-quill; internodes solid, woody, terete, smooth; nodes thickened. Leaves 6 by \$\frac{1}{2}\$ in., narrowed from the base to the slender tip, flat, rather rigid, smooth on both surfaces, base narrow rounded, midrib distinct; nerves many, slender; sheaths quite smooth; ligule a ridge of hairs. Panicle 6 in. high, branches filiform, lower nearly 2 in. long, sparingly divided; branchlets rather short; capillary. Spikelets quite glabrous; gls. rather thin, pale green; palea of III nearly as long as the gl., 2-toothed, nerves strong or slender; IV shorter than III, shortly stipitate, coriaceous, margins incurved; palea as large as the gl. Lodicules minute, orbicular. Filaments very short; anthers linear-oblong. Overy narrow; styles short, free, stigmas broad.—Rozburgh describes P. tenue as having "seeda ovate transversely waved," whereas they are quite smooth in P. antidotals.

42. P. elegantissimum, Hook. f.; tall, erect from the base, very slender, leaves subradical very long narrow softly pubescent base narrow, peduncle very long and slender, panicle effuse very broad laxly few-fid., branches long alternate distant solitary naked below and branchets capillary quite smooth, spikelets \(\frac{1}{10} \) in. few on each branchlet shortly pedicelled ovate acuminate, gl. I about \(\frac{1}{2} \) III ovate mucronate 5-7-nerved, II and III stipitate subequal ovate cuspidately acuminate, II 7-nerved 5 of the nerves strong above, III nerves 7 slender, palea small ovate, IV elliptic-oblong obtuse as long as II white shining smooth.

MALAY PENINSULA; Perak, Ridley.

Perennial. Stem 2-3 ft., tuited, and branched at the very base, stiff. Leaves chiefly subradical, 10-18 by 1 in., gradually narrowed from the base to the slender tip, strict, subrect, softly hairy all over; mouth of sheath villous; ligule a fascile of hairs. Panicle 12-18-by 6-12 in., scaberulous; branches 1-3 in. apart. Spitelets very few and remote, reddish; gl. I inserted much below the others; IV sessile by a broad base.—A most elegant grass.

43. P. acroanthum, Steud. Syn. Gram. 87; glabrous, erect, very slender, leaves narrow base contracted, panicle broad very effuse lax-fld.,

branches subsolitary naked below, and long spreading few-fid. naked branchlets capillary, spikelets $\frac{1}{13}$ in. long-pedicelled ovate-oblong acute glabrous or sparsely puberulous, gl. I = $\frac{1}{3}$ III ovate obtuse 1-nerved, II and III subequal subacute 5-nerved, III epaleate, IV elliptic-oblong subacute palea quite smooth. Miq. Prolus. Fl. Jap. 163; Franch. & Sav. En. Pl. Jap. ii. 162.

UPPER ASSAM; Mishmi Hills, Griffith .- DISTRIB. China, Japan.

Perennial. Stem 2-3 ft., erect, not or rarely branched; nodes glabrous. Leaves 3-5 by $\frac{1}{6-\frac{1}{3}}$ in., thin, flat, glabrous, as are the sheaths; ligule a few hairs. Panicle 3-4 in. long and broad, very lax, open, with few scattered brownish or greenish spikelets; branches branchlets and peticels perfectly smooth, gl. I II & III membranous; IV thinly coriaceous, sessile.—I find no trace of a palea in gl. III of any specimen. No other species of this group has sparsely pubescent spikelets, except var. β of P. maximum.

- β. Spikelets obtuse or subscute.
- * Gl. III. epaleate.
- 44. P. montanum, Roxb. Fl. Ind. i. 313 (excl. descr. gl. IV.); stem tall firm, leaves long lanceolate base broad deeply cordate, panicle large loose, rachis branches and pedicels very long capillary smooth, spikelets $\frac{1}{15}$ in. solitary oblong obtuse or subacute, gl. I = \frac{1}{2} III ovate 5-nerved, II and III subequal obtuse 5-nerved, III epaleate. IV ovate subacute smooth. Kunth Enum. Pl. 126; Benth. Fl. Hongk. 412; Thw. Enum. Pl. Zeyl. 360; Trim. Cat. Pl. Ceyl. 105. P. barbatulum, Wall. ms. P. courtallense, Nees & Arn. ex Wight Cat. n. 2342, Herb. 1362, 3049; Steud. Syn. Gram. 83. P. euchroum, Steud. l. c. 98. P. notatum (montanum, Roxb.), Wight Cat. 1362 (non Retz). P. trinavalium, Hb. Ham. ex Wall. Cat. n. 8722 A.—Panicum, Wall. Cat. n. 8719, 8722, 8739.

Hotter hilly parts of India, from the lower Himalaya in Garwhal, Duthie, to Sikkim, Burma, the Khasia Hills, and southward to Penang and OFFLON.—DISTRIB.

Malaya, China, Philippines.

Perennial. Stem 3-4 ft. or more, smooth, hard, sparingly branched. Leaves 5-7 by 4-14 in., thin, glabrous or pilose, smooth or scaberulous beneath, striate, base ciliate, midrib sometimes excentric; sheath glabrous or pubescent, mouth hairy; ligule obscure. Panicle 8-18 by 8-10 in.; branches whorled or alternate, axis sometimes glandular, lower strict and unbranched from 1-3 in. Spikelets terete, glabrous or faintly hairy; gl. II fugacious.—I do not find gl. IV to have 3 stripes as described and figured by Roxburgh, nor is it as broad as in his figure; but that the plant I have described is Roxburgh's is confirmed by a specimen so named by himself. P. montanum has been referred by Wight to the Sumatran P. notatum, Retz (Obs. iv. 18), but that plant is described as having scabrid branches of the panicle, purple spikelets, and acute glumes. The black spots at the axils of the panicle seen in dried specimens of both species, are probably due to a glandular secretion. Wallich's n. 8739, from Ava, has very long pedicels and broad glumes, and a broader gl. IV, but the latter is narrower thau in Roxburgh's figure. Duthie (Grass, N.W. Ind. 5) gives Stewart as authority for this grass being found in marshes near Peshawur, but I suspect that Isachne himalaica was taken for it.

45. **P. humidorum**, Ham. in Wall. Cat. n. 8721; tall, slender, leaves linear base narrowly cordate, panicle large loose, rachis branches and (rather short) pedicels capillary smooth, spikelets $\frac{1}{20}$ in. ellipsoid obtuse glabrous, gl. I = $\frac{1}{3}$ III obtuse 3-ne-ved, II and III obscurely 5-nerved, III epaleate, IV ovate or oblong smooth.

ASSAM; Goalpara, Hamilton. SILHET, CACHAB, the KHASIA and NAGA HILLS, and the JHEELS.

Perennial. Gregarious in water (Clarke). Habit of F. montanum, but much more slender, with narrower leaves 4-8 by $\frac{1}{2} - \frac{1}{8}$ in., a smaller panicle, with shorter pedicels and much smaller spikelets. Gl. II fugacious.

Var. ? perakense; stem rebust nearly as stout as a goose-quill below, leaves 1 in. brond, spikelets broader, nerves stronger. Perak, King's Collector (n. 2546).—

Probably a different species.

46. P. khasianum, Munro mss.; tall, leaves linear or linear-lanceolate base narrowly cordate, panicle very large branches very long slender smooth, pedicels long or short, spikelets subsolitary $\frac{1}{16} - \frac{1}{15}$ in. ellipsoid subacute glabrous, gl. I minute much shorter than III, nerves 0 or 3 obscure, II and III subequal 5-nerved, III epaleate, IV elliptic-oblong subacute smooth.

E. NEPAL and SIEKIM, alt. 4-7000 ft., J. D. H., Clarke. KHASIA HILLS, in

marshes, alt. 4-6000 ft., Griffith, &c.

Perennial. Stem prostrate and creeping below, then erect, 8-6 ft. Leaves 6-12 by $\frac{3}{3}-1\frac{1}{4}$ in., thin, glabrous hairy or subscabrid, many-nerved, base usually contracted with incurved auricles, not or obscurely ciliate; sheath smooth or hispidly hairy, mouth bearded; ligule very short, ciliate. Panicle 6-12 in., often as broad; lower branches nearly as long, solitary or fascicled, unbranched below.—Near P. montanum, differing in the narrower leaf-base, very short gl. I, and in gl. II not fugacious. Also near P. sarmentosum, from which the minute gl. I distinguishes it.

** Gl. III paleate.

47. P. sarmentosum, Roxb. Fl. Ind. i. 308; tall, branched, scandent, leaves long base narrow rounded, panicle pyramidal or ovoid loosely branched glabrous, rachis smooth, branches half-whorled capillary, spikelets $\frac{1}{18} - \frac{1}{16}$ in., sessile or shortly pedicelled ovoid tips obtuse ciliolate, gl. I = $\frac{1}{16}$ III or more obtuse or subacute 3-5-nerved, II and III subequal orbicular nerves 5 broad, III palea small narrow, IV small ellipsoid subacute dorsally rounded smooth. Kunth Enum. Pl. i. 126; Steud. Syn. Gram. 98. P. micrognostum & P. vacillans, Steud. l. e. 75; Miq. Fl. Ind. Bat. iii. 456. P. concinnum, Nees in Hook. Kew Journ. ii. (1850) 97; Steud. l. e. 78; Miq. l. e. 457. P. incomptum, Trin. Diss. ii. 200, Gram. Panic. 200, Sp. Gram. le. t. 232; Kunth l. e. 112; Steud. l. e. 88; Nees in Mart. Fl. Bras. ii. 207; Herb. Wight (Kew Distrib. n. 6492). P. maximum, Wall. Cat. n. 8715 E. P. tjicoyaense, Steud. l. e. 70. ? P. incomptum, Duthie Grass. N.W. Ind. 4. —Panicum, Wall. Cat. n. 8709.

ASSAW, SILHET, CACHAR, and the KHASIA HILLS, ascending to 5000 ft., CHITTAGONG, BURMA, and the MALAY PENINSULA.—DISTRIB. Malay Islds., China, Tonkin.

Perennial. Stems attaining 50 ft., often as thick as a goose-quill, solid, pubescent or glabrous, with whorls of long wiry slender branching roots at the bearded nodes below, whence the flowering branches issue. Leaves 12-15 by \frac{1}{2}\text{-1}\frac{1}{2}\text{ in., linear-lanceolate, finely acuminate, base rounded or subcordate, smooth or hairy on both surfaces or beneath especially, many-nerved; sheaths smooth or sparsely hairy; ligule a brush of hairs. Panicle 6-12 in., very variable, branches erect or spreading, long or short, branchlets often creeping and entangling, straight or flexuous. Spikelets erect or spreading.—Duthie gives P. incomptum as a native of Garwhall, alt. 4-5000 ft., but I have not seen P. sarmentosum, Roxb. from the westward of Assau, and I suspect that P. montanum is the plant intended. Of P. concinnum, which is

Cuming's n. 2284, Miquel says, stem villous under the panicle. Benth. (Fl. Hongk.) refers concinnum to sarmentosum, and includes incomptum. I do not find the Hongkong specimen in Herb. Kew. There are no specimens of this in Herb. Linn. Soc. and Wallich's ticket No. 8709 has A. Hb. Fiulayson, B. Silhet, C. Penang, D. Tavoy, E. Singapore.

Sect. VII. PTYCHOPHYLLUM. (See p. 28.)

48. P. plicatum, Lank. Encycl. iv. 736; perenvial, leaves plicate from linear-lanceolate to elliptic-oblong, panicle elongate lax-fid., branchlets often ending in a stiff bristle, gl. $I=\frac{1}{2}$ III or more orbicular-ovate 5-nerved, $II:=\frac{1}{2}$ IV or longer 5-7-nerved obtuse, $III:=\frac{1}{2}$ IV dorsally flattened acute 5-9-nerved, IV ovate-lanceolate rugulose. Jacq. Eclog. Gram. i. t. 1; Trin. Gram. Panic. 183, Gen. Pan. 161, Sp. Gram. Ic. t. 223; Kunth Enum. Pt. i. 94; Wall. Cat. n. 8705; Griff. Notul. iii. 24, Ic. Pl. Asiat. t. 139, fig. 229; Thw. Enum. Pl. Zeyl. 360 (excl. P. costatum); Trim. Cat. Ceyl. Pl. 105; Duthie Grass. N.W. Ind. 6, Fodd. Grass. N. Ind. 11; Benth. Fl. Hongk. 411; Anderss. in Walp. Ann. vi. 944. P. amplissimum, Steud. l. c. 54. P. asperatum, Kunth Revis. Gram. i. 39, Enum. Pl. l. c. 39; Miquel Fl. Ind. Bat. iii. 456. P. excurrens, Trin. Pan. Gen. 131, 249, Sp. Gram. Ic. t. 49; Kunth Enum i. 94; Benth. Fl. Hongk. 412, excl. syn. P. Kleinianum, Nees ex Anderss in Walp Ann vi. 946. Plene, Steud. l.c. 54. P. mauritianum, Willd. ex Spreng. Syst. i. 305. P. nepalense, Spreng. l.c. 321; Kunth Enum. i. 94; Dalz. & Gibs. Bomb. Fl. 291; Aitchis. Cat. Panjab Pl. 160; Miq. l. c. 448. P. nervosum, Roxb. Fl. Ind. i. 311; Wall. Cat. n. 8702. P. neurodes, Schult. Mant. ii. 228; Wight Cat. n. 1647; Anderss. l. c. 945; Duthie Grass N.W. Ind. 5. P. paucisetum, Steud. l. c. 52. P. palmifolium, Koen. in Naturforsch. xxiii. (1788) 208; Kunth Enum. 93; Anderss. l.c 945. P Wallichianum, Nees Fl. Afr. Austr. 49; Miq. l. c. 449.—Panicum, Wall. Cat. n. 8703.

Throughout the moister hilly parts of India, from Kumaon in the Himalaya eastward, ascending to 5000 ft. in Sikkim, the Shan Hills in Burma, the Nilghills, alt. 6000 ft., the Malay Peninsula, and Ceylon.—Distrib. China, Malay Islands.

Stem 1-8 ft., erect or ascending from a woody branched stock, from the thickness of a sparrow's to a swan's quill, leafy. Leaves 6-24 by 1-4 in., finely acuminate, sessile on the sheath or petioled, membranous or chartaceous, glabrous or sparsely hairy ; sheath sometimes hispid, mouth ciliate ; ligule short. Panicle thyrsoid, striate and erect with short branches, or effuse and drooping, 1-2 ft. long, with branches 2-4 in. long (spiciform in reduced states); branches, pedicels and their setiferous scabrid tips green or purplish. Spikelets 1 in., ovoid; gl. I = 1 III or less, very broadly ovate, obtuse or acute, 5-7-nerved, paleate or not, male or neuter; IV acuminate, coriaceous, more or less rugulose. - After a study of an immense suite of specimens of this species from all parts of India, I am unable to follow Andersson (in Walp. Ann. l. c.) in his separation of it into plicatum, palmifolium, neurodes and the seven vars. of the latter. These are, I think, all forms chiefly dependent on climate and age. Lamark's P. plicatum was described (1797) from a cultivated specimen of uncertain origin (Mauritius or St. Domingo), but Jacquin's excellent figure of it leaves no doubt of its identity with the Indian plant, for it resembles no American one. It has been widely cultivated for nearly a century, and a garden specimen in Beutham's Herb. supports the identification. I doubt P. palmifolium of Poinet being specifically different, it is described from an E. Indian specimen, though Grisebach (Fl. Brit. Ind. 547) identifies it with the W. Indian P. sulcatum, Aubl. Grisebach distinguishes palmifolium from plicatum by gl. II of the latter shorter than IV, and longer in palmifolium, but I find this a most variable character and not borne out by the

material that Grisebach worked upon. He also describes gl. IV as ellipsoid, but it is ovate-lanceolate in both. Whether *P. sulcatum* is specifically different may be doubted. *P. excurrens*, Trin., is a small narrow-leaved flaccid (perhaps young) state, with a very slender panicle and erect branches; it is Wall. Cat. n. 8708, and a common Himalayan form. Wall. Cat. n. 8706 is a gigantic form from Silbet, where I found it abundantly.

48.* P. flavescens, Sw. Prodr. Veg. Ind. Occ. 23, Fl. Ind. Occ. i. 158; annual, leaves plicate linear-lanceolate, panicle erect branches spreading simple pubescent and bristly, spikelets subsecund, gl. I = \frac{1}{4} \frac{1}{3} \text{III} orbicular obtuse 3-nerved, II = \frac{1}{2} \text{IV} apiculate 5-7-nerved, III = \frac{1}{1} \text{IV} 5-7-nerved paleate male, IV ellipsoid acuminate transversely rugulose. Kunth Enum. Pl. i. 128; Steud. Syn. Gram. 80; Griseb. Fl. Brit. W. Ind. 547. P. bartum, Telf. ew Wall. Cat. n. 8689 D. P. costatum, Rowb. Fl. Ind. i. 312; Wall. Cat. l. c.; Kunth l. c. 93; Steud. l. c. 64; Anderss. in Walp. Ann. vi. 947. P. fasciculatum \$\beta\$, Nees Agrost. Bras. 152. P. mauritianum, Herb. Willd. ew Spreng. Syst. i. 305. P. paractaenioides, Trin. in Mem. Arod. Petersb. Ser. 6, iii. II (1835) 219. P. Thouarsianum, Nees ew Steud. l. c. 62. P. plicatum var. costatum, Baker Fl. Maurit. 437. Setaria mauritiana, Spreng. Syst. i. 305 (ew Baker).

Cultivated in Hobr. Bor. Calc., Wallich. Siam? Herb. Finlayson .- Distrib.

Trop. Amer.

Stem 3-6 ft., slender above, stout branched creeping and rooting below. Leaves 5-8 by \(\frac{1}{2} - 1 \) in., finely acuminate, narrowed to the very narrow base, thin, flaccid, softly hairy on both surfaces; sheath with hispidly ciliate margins towards the contracted mouth; ligule obscure. Panicle 3-5 in., ovate-oblong, branches 1-1\(\frac{1}{2} \) in. Spikelets \(\frac{1}{10} \) in, subsessile, green.—This grass is described as annual by Grisebach, and as perennial by other authors.

49. P. rhachitrichum, Hochst. in Flora, xxvii. (1844) 254; annual, nodes of stem pubescent, leaves plicate, panicle subpyramidal, branches slender spreading and pedicels laxly hairy, gl. I minute membranous, II and III subequal ovate-oblong obtuse, III paleate neuter, IV ellipsoid rugulose tip rounded. Parlat. in Hook. Niger Flora, 187; Steud. Syn. Gram. 63. P. chamaeraphis, Nees ex A. Braun, Ind. Sem. Hort. Berol. (1853), App. 20; Anderss. in Walp. Ann. vi. 947. P. homonymum, Steud. l. c. 48; Duthie Grass. N.W. Ind. 4 (homogynum).

SUBTROPICAL HIMALAYA; Dehra Dhun, Royle; Chamba, alt. 5000 ft., Clarke; Kumaon, Duthie; Sikkim, alt. 6000 ft. Chota Nagpus and Calcutta, Clarke.

DISTRIB. Africa trop.

Stems tufted, erect, 8-18 in., leafy. Leaves 6-8 by 1-1½ in., flaucid, glabrous or sparsely hairy, base rounded; margins and mouth of sheath villous. Panicle 2-6 in., branches alternate spreading; rachis very slender, flexuous, bristle of pedicel twice as long as the spikelet. Spikelets 10 in., secund, 1-2-seriate, loosely or densely imbricate, sometimes fascicled in the Calcutta specimens, dorsally compressed; gls. membranous, pale, nerves green; I. 1-3-nerved; II 5-6-nerved, obtuse; III 5-nerved, palea minute.

Sect. VIII. GIBBOSE. (See p. 25.)

- * Spikelets usually shortly pedicelled.
- 50. P. trigonum, Retz. Obs. iii. 9 (excl. Syn. Burm.); leaves 1-2 in., panicle contracted, branches short, spikelets 1/2 in. very shortly pedicelled

hispidulous, gl. I = about ½ III obtuse or acute 3-nerved, III 5-nerved. Kunth Enum. Pl. i. 116; Nees Agrost. Bras. 206; Roxb. Fl. Ind. i. 305; Thw. Enum. Pl. Zeyl. 359 (in part); Trim. Cat. Ceyl. Pl. 205. P. difforme, Roth Nov. Sp. 52. P. gibbum, Steud. l. c. 87. P. radicans, Buhse in Mig. Pl. Jungh. 375; Mig. Fl. Ind. Bat. iii. 453 (non Retz). P. repens and Burmanni, Heyne ex Herb. Wight. Aira repens, Hb. Heyne ex Wall. Cat. n. 8743 A.—Panicum, Wall. Cat. 8743 A. C.

LOWER BENGAL, Wallich. The DECCAN PENINSULA, Heyne, &c. CEYLON,

Walker, &c., Thwaites (C.P. n. 858).—DISTRIB. Java.

Perennial. Stem as thick as packthread, decumbent branching and interlaced below; branches erect. Leaves linear-lanceolate, glabrous or laxly hairy; sheath glabrous or margin ciliate; ligule rounded. Paniele 1-1½ in., rachis and short suberect branches glabrous; gl. I-III pale brown; tip of IV naked or bearded.

51. P. pilipes, Nees & Arn. ex Büse in Miq. Pl. Jungh. iii. 376; tall, leaves 2-6 in., panicle contracted, branches short with often slender hairs on the pedicels, spikelets $\frac{1}{16}$ in. very shortly pedicelled glabrons, gl. I = about $\frac{1}{2}$ III obtuse 3-nerved, III 5-nerved. Wight Cat. n. 2343; Miq. Fl. Ind. Bat. iii. 453; Trim. Cat. Ceyl. Pl. 105. P. hermsphroditum, Steud. Syn. Gram. 67; Benth. Fl. Austral. vii. 485. P. oxyphyllum, Hochst. ex Steud. l. c. 65. P. carinatum, Presl Rel. Haenk. i. 309 (ex Hack. in Engl. Bot. Jahrb. vi. (1885) 235).—Panicum, Wall. Cat. n. 8748 B. D.

SIZEIM TEBAI, Clarke. KHASIA HILLS, alt. 0-2500 ft., common. BURMA, CENTRAL PROVINCES, NILGHIEI HILLS, alt. 4000 ft., the MALAY PENINSULA, NICOBAE ISLDS. and CEYLON (C.P. 100, 709, 891).—DISTRIB. Tonkin, Malaya,

Australia, Pacific Islds., Mascarene Islds. and Madagascar.

Perennial. Stem 1-2 ft., geniculately ascending from a slender creeping branching base, lower nodes rooting, upper subpubescent. Leaves \(\frac{1}{2}\)-1\(\frac{1}{2}\) in. diam., glabrous or sparsely hairy above, puberulous beneath, finely acuminate, base narrow; sheath glabrous or ciliate, mouth hairy; ligule rounded. Panicle 3-5 in.; branches rather remote, erect or spreading with short fastigiate branchlets; spikelets brown; gl. IV white, its palea narrow, patent, hard.—The Madagascar and Seychelle Islds. P. multinode, Lamk, is very closely allied, if not the same, in which case that name takes priority. In Nicobar specimens the spikelets are sparsely pubescent. Thwaites regarded pilipes as a form of P. trigonum.

** Pedicels capillary, much longer than the spikelets.

52. P. patens, Linn. Sp. Pl. 86; stem creeping and rooting below, leaves ovate to linear-lanceolate glabrous or ciliated below with tubercle-based hairs, paniele contracted or effuse, rachis branches and pedicels capillary, gl. 1 = \frac{1}{2} - \frac{3}{4} III ovate obtuse 3-nerved, II and III glabrous or with ciliate tips. Burm. Fl. Ind. t. 10, f. 2; Spreng. Syst. i. 322 (excl. sym. multinode); Kunth Enum. Pl. i. 126 (excl. sym. Roxb.). P. accrescens, Trin. Sp. Gram. Ic. t. 88, & corrigend. vol. iii.; Kunth l.c. 116. P. obliquum, Roth Nov. Sp. 51; Kunth l.c. 103; Miq. Fl. Ind. Bat. iii. 452. P. radicans, Retz. Obs. iv. 18; ? Trin. Pan. Gen. 218; Nees Agrost. Bras. 206; Kunth l.c. 216; Wight Cat. n. 2344. P. trigonum, in part, Thw. Enum. Pl. Zeyl. 359. P. velutinum, Willd. Herb. ex Spreng. l. c.—Panicum, Wall. Oat. n. 8738, 8740.

Throughout India, from the Lower Himalaya in Garwhal to Sikkim, and the Khasia Hills, secending to 3000 ft., southward to the Malayan Peninsula and Ceylor...—Distrib. E. tropical Asia and the Malay and Pacific Islds.

Stem 1-3 ft., branched below, leafy; nodes glabrous. Leaves 2-6 by 1-1 in.,

thin, finely acuminate; margins and mouth of sheath ciliate; ligule rounded. Panicle 2-5 in., usually inclined with spreading glabrous or puberulous branches naked below, and very long distant spreading branchlets. Spikelets $\frac{1}{\sqrt{6}}$ in. long.—Very variable in the size of the whole plant and of its leaves and panicle. The smaller forms agree with the specimens of P. patens in the Linnean Herbarium, and are Wallich's n. 8740, and n. 8788 C.; the larger are P. accrescens of Trinius (referred by himself to obliquem, Roth.), and are Wallich's 8738 A. B. D. A small variety? with larger spikelets, nearly $\frac{1}{\sqrt{3}}$ in. long, occurs in the Nilghiris (Herb. Wight n. 8047); at Goodavery Ghats, Lawson; and in Ceylon, at Newera Elia (C.P. n. 886).

53. P. longipes, Wight et Arn. in Wight Cat. n. 1638; tall, leaves 4-10 in., panicle 5-10 in. fastigiately supra-decompound, branches and long pedicels capillary, spikelets $\frac{1}{13}$ in. glabrous, gl. I nearly = III ovate scuminate 3-nerved, II and III acute. Aira capillaris, Heyne in Herb. Rottler, & in Wall. Cat.—Panicum, Wall. Cat. n. 8741.

NILGHIRI and PULNEY HILLS, Heyne, &c.; Karkun Ghat, slt. 2000 ft., Laucson.

- Stem 2-8 ft. and upwards, as thick as a crow-quill, quite smooth, base decumbent. Leaves \(\frac{1}{2} \) in. broad, finely scuminate, narrowed and sparsely hairy at the base, finely puberulous beneath; sheath nearly glabrous; ligule rounded. Panicle subfastigiately branched; branches simple sometimes naked below for an inch and more, then fastigiately branched. Ppikelets pale brown; gl. II and III with sparingly ciliolate tips.—Distinguished from P. patens by the greater size, robuster habit, and much larger spikelets with acute glumes. What may be a small state of it was found at Golaghat, Seebsagur, by Clarks. Compare also the form of P. patens with larger spikelets.
- 54. P. sparsicomum, Nees ex Steud. Syn. Gram. 83; stem filiform diffusely branched, leaves $1-2\frac{1}{2}$ in. softly pubescent, panicle effuse of few long capillary branches and branchlets, spikelets $\frac{1}{16}$ in. oblong glabrous, gl. I = $\frac{1}{2}$ III faintly 3-nerved, II longest and III ovate-lanceolate acute 5-nerved, IV thin pale. Wight Cat. n. 1635 (name). Agrostis zeylanica? Herb. Wight.; Klein ex Steud. l. c. 83.

CETLON; Cookle or Cocklaj, Jan. 23rd, 1796, Heyne in Herb. Rottl.

Stems 6-18 in., almost capillary, rooting at the nodes. Leaves 1-1 in. broad, acuminate, hairy on both surfaces; sheaths and their mouths hairy. Panicle on a filiform peduncle, 3-4 in. long and broad. Spikelets few, distant; gl. IV not so strongly laterally compressed and gibbous as in its allies.—A very distinct species, I think, but not easily characterized.

Sect. IX. Pseudechinolæna. (See p. 28.)

55. P. uncinatum, Raddi Agrost. Bras. 41; Trin. Gram. Panic. 174, Sp. Gram. Ic. t. 216; Kunth Enum. Pl. i. 172; Steud. Syn. Gram. 60; Thw. Enum. Pl. Zeylan. 359; Trim. Cat. Ceyl. Pl. 105. P. echinatum, Willd. ex Doell in Mart. Fl. Bras. ii. II, 193. P. glaudulosum, Ness ex Trin. Gram. Panic. 174. P. heteranthum, Link Enum. Hort. Berol. i. 212. P. nemorosum β, Trin. l. c. 174. P. Trinii, Mor. Syst. Verz. Zoll. 102. Echinolæna polystachya, H. B. & K. Nov. Gen. & Sp. i. 119, t. 679; Kunth l. c. i. 172, Suppl. 127. Cenchrus lappaceus, Herb. Heyne. P Lappago aliena, Spreng. Neue Entdeck. iii. 15.—Echinolæna, Wall. Cat. n. 8661.

EASTERN HIMALAYA; from Nepal to Sikkim, alt. 8-6000 ft. KHASIA, NAGA,

and MUNNEPORR HILLS, alt. 2-5000 ft. South Decuan, on the Shivagerry Hills,

Wight. CEYLON, common - DISTRIB. Trop. Asia and America.

Perennial. Stem decumbent, straggling and branched below: branches 4-18 in., leafy, slender. Leaves 2-4 in., ovate-lanceolate, membranous, flat, base narrow oblique; sheath ciliate; ligule oblong, scarious. Panicle 1-3 in.; branches 2-6, distant, spiciform, flexuous, scaberulous. Spikelets 1-1 in., solitary or 2-nate, dimidiate-ovate; pedicels very short, uncinate, scabrid; gl. I oblong-lanceolate, acuminate, keeled, 8-nerved, tip scabrid; II gibbously cymbiform, acute, 7-nerved, pale dull red, hispid, hairs sometimes hooked: III broadly ovate, obtuse, 7-nerved, paleate, male, green, sides centre and obtuse tip broadly hyaline, lateral nerves approximate: IV cymbiform, shorter than III, laterally compressed, thinly coriaceous. Lodioules 0.

DOUBTFUL AND EXCLUDED SPECIES.

P. ABLUDENS, Rosm. & Schutt: Syst. ii. 457; Roth Nov. Sp. 58. P. ramosum, Heyne mes. ex Roth l.c. P. paradoxum, Rottl. mes. ex Roem. & Sch. l.c., is evidently a Paspalum.

P. ACICULARE, Desv. in Poir. Encycl. Suppl. ii. 274; Nees Agrost. Bras. 285; Kunth Enum. Pl. i. 116; Steud. Syn. Gram. 82, is, I suspect, an American species, erroneously described as E. Indian. There is no Indian Panicum at all answering to it.

P. ANGUSTATUM, Edgew, in Journ. Beng. As. Soc. xxi. (1852) 157: name only.

P. ARANEOSUM, Edgew. in Index Kewensis, is an error for Pennisetun araneosum. Edgew. (= Penn. lanuginosum).

P. CONCINNUM, Edgew. l. c. 157, 179, 187; the description will apply to various

species.

P. FESTUCOIDES, Poir, Encycl. Suppl. iv. 283; Kunth Enum. Pl. i. 181 is undeterminable.

P. FLEXUOSUM, Rets. Obs. iii. 9, and iv. 16; Steud. Syn. Gram. 83, described as an Indian Plant of Koenig's by Retz., is doubtfully referred to the Brasilian Isachne ventricosa by Doell in Mart. Fl. Bras. ii. II, 274. Retz describes it as being like

capillare, Linn., but with the nodes bearded by reflexed hairs.

P. FUGAX, Koen. in Naturf. xxiii. (1788) 209; Gmel. Syst. 162; Kunth l.c. 134, is undeterminable.—Mr. Rendle informs me that this probably refers to a plant alluded to by Koenig in his correspondence (now in the British Museum) as "a decumbent Panicum growing in rice-fields, in which the panicle flowered almost before it had left the sheath, often a larva is found in the flower when the latter perishes otherwise it is caducous." A diseased Panicum (possibly P. psilopodium) bearing the name P. mesetiferum, Koen, mas, in Herb. Mus. Brit, is presumably the plant.—I find dispased spikelets to be frequent in P. psilopodium.

P. HEYNII, Roth Nov. Sp. 49; Kunth l. c. 180; Steud. l. c. 80; branches of oblong panicle strict divided, base hairy, lowest whorled with fascicled flexuous scabrid branchlets, pedicels solitary alternate, gl. I cordate obtuse embracing the

spikelet, leaves sharply serrate, margins and mouth of sheath hairy.

P. INVIDUM, Steud. Syn. Gram. 63, is probably a Paspalum.
P. Kunthii, Steud. Nom. Ed. II, ii. 258. P. orthum, Voigt Hort. Suburb. Calcutt. 701; P. Pseudostricta, Steud. Syn. Gram. 89; Digitaria stricta, Roth Nov. Sp. 38; Setaria? stricta, Kunth Revis. Gram. i. 47, Enum. Pl. i. 157. I

have failed to identify this plant. It is possibly a Paspalum.

P. EEPENS, Rosb. Ic. ined. t. 111, 112, 796. Three plants of the section Brachiceria thus named are in Roxburgh's collection of drawings, none of them answering to his description of revens in Fl. Ind. (which I take to be P. vestitum), nor to the P. repens, Linn. All are represented as perfectly glabrous, with stem 12-18 in. high, creeping below; leaves tiat, 4-5 in., strict, narrowed from a rounded base to the top; panicle 4-6 in.; spikes 10-20, 1-1\frac{1}{2} in.; spikelets subsessile, about \frac{1}{2} in., close set, sometimes obscurely paired, green; gl. I \frac{1}{2} - \frac{1}{2} III, 5-nerved. In t. 111 the spikes are about 10, distichously spreading. In t. 112 there are about 20 distichously spreading spikes. In t. 796 there are 10, all secund. The grain of t. 111 is ovate-lanceolate, acuminate, with three dorsal lines; of t. 212 ovate-lanceolate, acuminate; of t. 796 elliptic-oblong, acute.—It is evident that in this as in other cases, Roxburgh had not named his Icones in accordance with the descriptions prepared for the "Flora Indica,"

P. SERICEUM, Soland. in Ait. Hort. Kew, 88, is a West Indian plant erroneously

enteredas from " Ind. Or." by Steudel.

P. SINCLICISIMUM, Keen in News Schrift. Naturf. xxiii. (1788) 209 (con Index Kewensis). There is no such species described in the work cited, but Mr. Rendle has pointed out toome that at the bottom of the page Koenig mentions a very flue grass sent by him to Dr. Solander, adding, "Er hat eine Paniculam simplicissimam."

P. TENUE, Roxb. Fl. Ind. i. 310; stem 1-6 ft. erect, ramous, panicle thin, spikelets binate on a common hairy pedicel with unequal partial pedicels, gl. III paleate, grain ovate transversely waved.—Wild in the Circar Mts. (Roxh.).—Stem sometimes prostrate and rooting. Leaves large, upper surface hairy, margins with very sharp points; sheaths shorter than the internodes, hairy, mouths bearded. Panicle erect, till fruiting, then bowing as in P. miliaceum, of alternate compound nearly secund racemes; rachis 4-5-angled, branchlets 3-angled, flexuous hairy. Spikelets smooth, gls. many-nerved, III male in luxuriant plants.—I have altered Roxburgh's phraseology to bring it into harmony with that of this work. I have seen no plant answering to the above description except perhaps a small state of P. maximum.

P. FRACHYPUS, Trin. Panic. Gen. 170; rays subracemiform, shortly compound from the base alternate, raylets spreading, pedicels very short, spikelets lineal obovate submucronulate pubescent, gl. I 3-4 times shorter than the spikelet, 3-nerved, II 5-nerved, 4 mucronate rugose. Leaves glabrous lanceolate from a cordate base.—

Nepal.

P. TRIFLORUM, Edgew. in Journ. As. Soc. Beng. xxi. (1853), 157, 179; Duthis Grass. N. W. Ind. 7, Fodd. Grass. N. Ind. 13; Edgeworth's description will apply to various species.

5. ICHNAMTHUS, Swartz.

Annual or perennial branching grasses. Leaves broad. Spikelets 1-2-fid., long panicled, ovate or lanceolate, terete, articulate (but often persistent) on their pedicels. Glumes 4, I II and III subequal or II longest, strongly nerved; III paleate or not, male or neuter; IV much shortest, stipitate, paleate, bisexual, oblong or oblong-lanceolate, stipes with an anticous simple or 2-fid or 2 lateral appendages. Lodicules 2, minutes Styles free, exserted apically. Stamens 3. Grain coriaceous, acute or acuminate, polished, articulate at the base of the stipes.—Species about 20, tropical.

This genus differs from Panicum in the appendaged base of gl. IV.

1. **I.** pallens, Munro in Benth. Fl. Hongk. 414; stem slender elongate, leaves broadly lanceolate, panicle open, rachis and subsecund branches slender, gls. spreading, I ovate-lanceolate acuminate, III paleate neuter or male, IV when mature exposed, turned on one side, oblong obtuse, appendages 2 adnate to its sides. Thu. Enum. Pl. Zeyl. 361; Trim. Cat. Ceyl. Pl. 105. Panicum pallens, Swartz Prodr. 23, Fl. Ind. Occ. i. 164; Kunth Enum. Pl. i. 89; Nees Agrast. Bras. 137; Trim. Sp. Gram Ic. t. 211; Griseb. Fl. Brit. W. Ind. 550. P. vicinum, Baily Syn. Queensland Fl. iii. 82. Apluda Zeygites. Aubl. Pl. Guian. ii. 933 (excl. Syn.). Pagrostis nutans, Poir. Encycl. Suppl. i. 255.

SIERTH HIMALAYA; ascending to 3500 ft. KHASIA HILLS, alt. 1-4000 ft.,

Assam, and Bengal.—Ceylon, alt. 4000 ft.—Distrib. Tropics generally.

Stem 1-2 ft., weak. decumbent; loosely branched, more or less pubescent. Learne 8-6 by \$\frac{1}{2}\$-1 iu., broadly-lanceolate, thin, flat, caudate-acuminate, scaberulous; base rounded or cordate, ciliate; sheath lax; ligule a few hairs. Panicle 8-4 iu., unilateral; branches erect or spreading, and pedicels scaberulous. Spikelets \$\frac{1}{2}\$ iu. long, green; gl. I-III persistent, keels scabird; I more than \$\frac{1}{2}\$ III, ovate-lanceolate, subaristate, 3-nerved, II acuminate 5-nerved; III obtuse 5-nerved, palea large; IV = \$\frac{1}{2}\$ III deciduous, smooth, pale, turned half round so that the long diam is at right angles to the plane of the spikelets; appendages obscure.—The oblique position of the grain is very peculiar.

2. Z. foliolosus, Munro in Herb. Kew; dwarf. hispidly hairy, fastigiately brauched from the base, leaves short almost subulate, spikelets in in short panicles half immersed in the leafy tips of the short branches erect, gl. I nearly = III 5-nerved, II longer than III subaristate, III epaleate 5-nerved, IV ellipsoid acute, appendage minute anticous 2 lobed. Panicum foliolosum, Wall. Cat. n. 8680.

BURMA; Ava, Wallich; Mengoon, J. Anderson.

Densely tuited, 6-8 in. high, stiff, branches subcrect or prostrate to the tips. Leaves 1-14 by 1-3 in., flat, strongly many-nerved, clothed like the short sheaths and panicles with spreading hairs; ligule of rigid hairs. Panicles with short erect angular branches. Spikelets green, tips scabrid; gl. IV much shorter than III, stipitate, base truncate.—A very peculiar species.

6. THYSANOLARNA, Nees.

A very large glabrous grass; stem solid. Leaves broad, flat. Paniele very large, effuse, with myriads of crowded long filiform compound suberect branches and branchiets bearing innumerable subsecund very minute
1-fld. spikelets which are jointed on very short pedicels. Glumes 4; I and
II minute, concave, obtuse, awnless; I shortest nerveless; II nerveless;
III much longer, epaleate, empty, coriaceous, acuminate, 1-nerved, hardening; IV rather shorter membranous, oblong, acute, clothed with white
erect hairs, palea short, truncate. Stamens 2-3, anthers short. Styles
free. Grain most minute, free within the hardened glumes.

• T. Agrostis, Nees in Edinb. new Phil. Journ. xviii (1835) 180; Steud. Syn. Gram. 119. T. maxima, Herb. O. Kuntze. T. acarifera, Arn. & Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 181; Wall. Cat. n. 8882; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1890) 347; Duthie Grass N. W. Ind. 13, Fodd. Grass. N. Ind. 21. Panicum acariferum, Trin. Sp. Gram. Ic. t. 87; Baker Fl. Mourit. 437; Miq. Fl. Ind. Bat. iii. 517. P. Amlisa, Herb. Ham. ex Wall. l. c. C. Myriachaeta arundinacea, Zoll. & Mor. Syst. Verz. Zoll. 101; Steud. Syn. Gram. 404. M. glauca, Mor. ex Steud. l. c. 404; Zoll. Syst. l. c. Melica latifolia, Roxb. Fl. Ind. i. 328. Agrostis maxima, Roxb. l. c. 317. A. latifolia, Heyne in Herb. Rottl. (non Trevir.). A. scoparia, Koenig ex Herb. Rottl. (non Steud.). Arundo montana, Herb. Ham. ex Wall. l. c. B.

SUBTROPICAL HIMALAYA, from Kumson eastwards and the Khasia Hills, alt. 4-5000 ft. Behar; on Parus-nath. The Deccan, Burma; Nicobar Isl.s., and Penang. Distrib. Eastw. to New Guinea.

Stem 4-12 ft., sometimes as thick as the little finger. Leaves 1-2 ft. by 2-4 in., coriaceous, tapering to a fine point, base cordate; mouth of sheaths hairy; ligule

short, ciliate. Paniele 1-2 ft., soft, quite glabrous. Spikelets $\frac{1}{10}$ in., pale yellow, rather shining, very obscurely jointed on the pedicels which are jointed on the branches.—Myriachasta glauca, Mor., was founded on the erroneous supposition that its gl. IV was hairless. The spikelets are sometimes viviparous.

7. CHAMADRAPHIS, Br.

Glabrous marsh or aquatic grasses. Leaves linear or lauceolate. Spikelets 1-2-fld., subsessile and subsecund on the branches of a simple panicle which are produced in an awn-like bristle beyond the terminal spikelet, obscurely articulate on their pedicels, narrowly lanceolate. Glumes 4, I very small, truncate, hyaline, nerveless; II longest, acuminate or narrowed into rigid awn, 5-many-nerved; III lanceolate acute or aristately acuminate paleate male or neuter; IV very small, oblong, hyaline, fem. or bisexual; palea hyaline. Lodicules of male fl. cuneiform. Stamens 3. Styles free. Grain linear-oblong, compressed, free within the gl.—Species 5-6, trop. As. and Austral.

Besides the spikelets on the branches of the panicle, there are often one or more on the peduncle below the panicle, which are appressed, and sometimes somewhat sunk in a groove of the peduncle. The species are very variable.

1. C. spinescens, Poir Encycl. ii. 189; stems elongate rather stout, panicle pyramidal or contracted, branches with one few or many spikelets each 1-1 in., glume III aristately acuminate many-nerved, IV obtuse. Brath. Fl. Austral. vii. 499; Trim. Cat. Ceyl. Pl. 106. C. aspera, Nees in Wall. Cat. n. 8679; Wight Cat. n. 1655; C. paradoxa, Poir. l.c., Kunth Enum. Pl. i. 148, Suppl. 105. C. spinosa, Beauv. ex Schult. Mant. ii. 253. Panicum asperum, Koen. in Naturf. xxiii. (1788) 209; Wight ex Steud. Sym. Gram. 49; Thwaites Enum. Pl. Zeyl. 436. P. spinescens, Br. Prodr. 193; Kunth Enum. Pl. i. 131. P. ischæmoides, Heyne ex Wall. l.c. P. squarrosus, Lam. Encycl. iv. 743; Kunth Enum. Pl. i. 131. Andropogon squarrosus, Linn. Herb. Echinochloe squarrosa, Roem. & Sch. Syst. ii. 479. Orthopogon squarrosus, Spreng. Syst. i. 307. Setaria longiflora, Desv. Opusc. 81.

MARWAR; on Mt. Aboo, King. BANDA, Duthie. LOWER BENGAL, Rosburgh, Griffith, &c. South Deccan Peninsula, Heyne, Wight, &c. Ceylon, Ferguson Glennie.—Distrib. China, Malaya, Australia.

Floating in much branched masses, with leafy stems 1-3 ft., and panicles 2-4 in. long, varying very much in the number and size of their spikelets. Leaves 1-3 in., and their somewhat inflated sheaths smooth or scaberulous. Spikelets \(\frac{1}{4}\)-\(\frac{1}{4}\) in. long.

Var. Brunoniana; spikelets one or two on the branches of the panicle \(\frac{1}{4} - \frac{1}{2} \) iu. long. Panicum Brunonianum, Griff Ic. Pl. Asiat. t. 145 and 139, f. 107. P. (Chamaeraphis) intermedium, and Pseudoraphis Brunoniana, Griff. Notul. iv. 29. Holcus natans, Herb. Rozb.—Lower Bengal, Rozburgh, Griffith.—Tonkin, Australia.

Var. depauperata; slender, leaves very short, panicle short contracted, spikelets in. C. depauperata, Nees in Wight Cat. n. 1654; Steud. Syn. Gram. 49; Trim. Cat. Ceyl. Pl. 106. Panicum sordidum, Thw. Enum. Pl. Zeyl. 448.—Jheels of Bengal, the Deccan and Ceylon.

2. C. gracilis, Hack. in Engl. Bot. Jahrb. vi. 326; branches of panicle many simple with many minute spikelets $\frac{1}{10}$ in. long.

LOWER BERGAL; Clarke. CACHAR, Keenan. BURMA, Kurs .- DISTRIB. Tonkin.

Steme 6-8 in., decumbent and rooting at the nodes, geniculately ascending,

branches slender; internodes 1-2 in. Leaves 1-1½ by ½-½ in., spreading, strict, linear, acute, striate, base rounded, glabrous or sparsely hairy; sheaths broad, loose, membranous, compressed, 2-auricled, glabrous; ligule short, hyaline, toothed. Paniele shortly exserted beyond the upper sheath, 1-2 in. long, rachis and erectopatent subsimple branches capillary, smooth. Spikelets very shortly pedicelled, green or brownish; gl. I truncate; II straight, sometimes long-acuminate or almost beaked, glabrous or obscurely sparsely hairy, nerves close, strong; III ½-½ shorter than II, subacute; IV about ½ III.—Very near the Australian C. abortiva, Poir. (C. spinescens var. parvispicula, Benth.) which has a lax panicle with few branches and spikelets.

8. SPINIFEX, Linn.

Stout, rigid, bushy, polygamo-diocious grasses. Leaves long, rigid, involute. Male spikelets 2-fld., subsessile, articulate on rigid pedunoled spikes, which are collected in umbels surrounded by spathaceous leafy bracts; glumes 4, membranous, not awned; I and II empty; III and IV paleate, triandrous. Fem. spikelets: collected in large globose heads of stellately spreading very long rigid rod-like rachides, surrounded by shorter subulate bracts; each spikelet solitary, and articulate at the very base of a rachis, lanceolate, 2-fld. Glumes I, II, III, as in the male, but larger; III paleate, empty or triandrous; IV fem. Lodicules 2, large, nerved. Styles long, free; stigmas shortly feathery. Grain free within the hardened glumes.—Species 4; an Indian and 3 Australasian.

S. squarrosus, Linn. Mant. ii. 300; glabrous, glaucous, leaves pungent, male spikes 2-3 in., spikelets distant, fem. spikelets concealed by the bracts. Lamk. Illust. t. 840; Kunth Enum. Pl. i. 175; Wall. Cat. n. 3631; Steud. Syn. Gram. 113; Thv. Enum. Pl. Zeyl. 362; Trim. Cat. Ceyl. Pl. 106; Elliott Fl. Adrh. 163; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1890) 339; Duthie Grass: N.W. Ind. 11; Benth. Fl. Hongk. 415; Miq. Fl. Ind. Bat. iii. 474. S. dioicus, Ham. ex Pritz. Icon. Index, 1058. Stipa littorea, Burm. f. Fl. Ind. 29. S. spinifex, Linn. Mant. i. 84.—Rheede Hort. Mal. xii. t. 75.

Sandy coasts of both Peninsulas, Burma, and Cerlon.—Distrib. Java, China. A squarrose gregarious bush, several feet high and broad. Leaves 4-6 in.; sheaths often imbricating; ligale very short, hirsute. Peduacles of male 2-3 in.; escaberulous, tips naked, pungent. Male spikelets ½-½ in.; gls. thin, all glabrous, I and II subequal, oblong lanceolate, acuminate, 7-9-nerved, nerves scaberulous; III rather longer, 5-nerved, paleate; IV shorter, ovate-lanceolate, acuminate, 5-nerved; paleas of III. and IV. narrowly lanceolate, keels ciliate. Fem. spikelets ½ in., narrowly lanceolate; gls. all glabrous, I oblong-lanceolate, acuminate, many-nerved, nerves scaberulous; II rather shorter, acute, 7-nerved; III like II, 5-nerved; IV ovate-lanceolate, abruptly narrowed above the middle and acuminate, 5-nerved; palea shorter but broader than the gl., acute, 2-nerved, keels smooth, style very long, branches slender.

9. AXONOPUS, Beauv.

Perennial grasses. Spikelets 2-fid., articulate with the pedicel, sessile or subsessile in whorled, or digitate spikes, awned. Glumes 4, I shortest, ovate, acuminate or cuspidate, glabrous, 3-nerved; II ovate-lanceolate, acuminate or awned, 5-nerved, lateral nerves marginal villous; III oblong, acute, 5-nerved, paleate, male, palea very short 2-fid or 2-partite; IV = II,

oblong or ovate, coriaceous, narrowed into a straight subulate awn; palea oblong, coriaceous, 2-nerved. Lodicules cuneate. Stamens 3, anthers long. Styles distinct. Grain small, suborbicular, free within the glumes.

A natural genus, remarkable for the small cleft pales of gl. III. It was established by Beauvois on Panicum cimicinum, Retz, to which other grasses having no affinity with it were added. Kunth erred in taking up Beauvois Urochloa (which is Panicum javanicum, Poir) and placing A. cimicinum in it.

1. A. cimicinus, Beauv. Agrost. 12; leaves ovate or ovate-lanceolate, spikes subverticillate. Panicum cimicinum, Retz. Obs. iii. 9; Rottl. in Neue Schrift. Ges. Naturf. Freund. iv. (1803) 191, 194; Roxb. Fl. Ind. i. 295; Thw. Enum. Pl. Zeyl. 358; Trim. Cat. Ceyl. Pl. 104. P. conjugatum, Dalz. & Gibs. Bomb. Fl. 291. Urochloa cimicina, Kunth Revis. Gram. i. 31, ii. 56, t. 103, Enum. Pl. i. 74, Suppl. 56; Dalz. & Gibs. Bomb. Fl. 289. Coridochloa cimicina, Nees in Edinh. N. Phil. Journ. xv. (1833) 381. C. fimbriata, Nees ex Wight Cat. 1656; Wall. Cat. n. 8749; Aitchis. Cat. Panjab Pl. 158. Milium cimicinum, Linn. Mant. 184.

Throughout India, in the plains and lower hills, Burma, Penang and Cerlon.

-DISTRIB. Malaya, China.

Stem 1-2 ft., tufted, stout or slender, erect, or decumbent and geniculate at the base, and leaves hirsute with long spreading white hairs. rarely glabrescent. Leaves 1-3 by ½-1 in., sente or obtuse, flat, green, striate, ciliate, base deeply cordate, ligule obsolete. Spikes 3-8 in a whord, 1-6 in. long; rachis filiform, simple or divided, scaberulous; flowerless below. Spikelets ½-½ in. long, solitary or clustered, very shortly pedicelled, dorsally compressed, pale, rather shining; gl. I acuminate; II mucronate or shortly awned; III acute; IV with a setiform awn.

2. A. semi-alatus, Hook. f.; leaves long linear, spikes few subdigitate. Panicum semi-alatum, Br. Prodr. i. 192; Benth. Fl. Austral. vii. 472; Thw. Enum Pl. Neyl. 358; Trim. Cat. Ceyl. Pl. 104. P. viaticum, Griff. Ic. Pl. Asiat. t. 145, f. 2. Bluffia Eckloniana, Nees in Lindl. Introd. Nat. Syst. Ed. II 447. Ceridochloa semi-alata, Nees in Edinb. New Phil. Journ. xv. (1833) 381. Urochloa semi-alata, Nees in Edinb. New Phil. Enum. Pl. i. 74. Oplismenus semi-alatus, Desv. Opusc. 81. Arundiella Schultzii, Benth. l. c. 545. Aira viatica, Griff. Notul. iii. 54. Holosetum philippinense, Steud. l. c.—Coridochloa, Wall. Cat. n. 8758.

SUBTROPICAL HIMALAYA, alt. 4-6500 ft., from Kumaon to Sikkim. The Khasia Hills, alt. 4-5000 ft.; Munnepore; Burma, Collet; Behar on Parusnath 3-5000 ft. Chylon up to 5000 ft.—Distrib. Mauritius, S. Africa,

China, Philippines, Australia.

Stems 1-3 ft., densely tufted, bases thickly clothed with the woolly remains of old leaf-sheaths. Leaves 8-12 by \(\frac{1}{6} - \frac{1}{4} \) in., glabrous or pubescent, finely acuminate; ligule obscure. Spikes 2-5, 3-6 in. long; rachis slender subflexuous, smooth or hairy. Spikelets \(\frac{1}{4} \) in., pale or brown, solitary or in distant pairs, sessile or pedicelled.

10. TRICHOLENA, Schrad.

Erect, tufted, annual or perennial grasses. Leaves narrow. Spikelets 1-2 fld., articulate on their pedicels, panicled, laterally compressed, clothed with long silky hairs, callus stipitiform. Glumes 3 or 4, I if present very small, often inserted much below III; II and III subequal, membranous, broadly ovate, mucronate or awned, dorsally rounded; III paleate, triandrous; IV very thin, shining, fem. or bisexual. Lodicules 2, minute, dolabriform. Grain loose within the gls.—Species many, chiefly S. African.

A genus the characters of which cannot be satisfactorily determined till a great many indetermined species are examined. It differs from Panicum in the villous or silky awned spikelets with membranous glumes. The two Indian species differ remarkably in the form of gl. IV.

1. T. Teneriffe, Parlat. in Webb & Berth. Phyt. Canar. iii. 425, Fl. Ital. i. 130; perennial, gl. I minute or obsolete, IV sessile ovate-lanceolate acuminate margins incurved. T.- micrantha, Schrad. in Sch. Mant. ii. 163; Nees in Ann. Sc. Nat. Ser. II vi. (1836) 106. Panicum plumosum, Prest Fl. Sic. i. 43. P. saccharoides, Trin. Grum. Panic. 245. P. Teneriffæ, Br. Prodr. 189; Kunth Enum. Pl. i. 98, Suppl. 75. P. villosum, Prest Gram. & Cyp. Sic. 18. Saccharum Teneriffe, Linn. f. Suppl. 106; Jacq. f. Eclog. Gram. 51, t. 34 (excl. Syn.); Biv. Bern. Stirp. Sic. Rar. iv. 5, t. 1. Sibth. Fl. Greec. i. t. 53 (excl. Anal.). Agrostis plumosa, Ten. Fl. Nap. Prodr. Suppl. i. 59.

Western Panjab, Falconer; alt. 3500 ft., Stewart. SCIND, Stocks,-DISTRIB. Westward to Sicily and N. Africa.

Stems many from a woody stock, geniculate below, slender, rigid. Leaves very slender, convolute, rigid, glabrous; mouth of sheath bearded; ligule, a narrow membrane. Panicle 2-4 in. rather open, branchlets and pedicels capillary. Spikelets Ta-1 in., white or purplish, silky with spreading bairs; gle. II and III ovate acute or mucronate, concave: IV articulate at the base, white or brown, shining.

2. T. Wightii, Nees & Arn. ex Steud. Syn. Gram. 93; annual, gl. I very small linear, IV ellipsoid obtuse convolute. Nees in Wight Cat. n. 2345; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1890) 347. T. micrantha, Schrad. in Sch. Mant. ii. 163; Schmidt Beitr. Fl. Cap. Verd. 153. T. tuberculosa, Hack. mss. Rhynchelytrum Wightii, Duthie Fodd. Grass. N. Ind. 21. Panicum megalanthum, Steud. Syn. Gram. 93. Saccharum Teneriffæ, Parl. in Hook. Niger Flora, 183 (excl. Syn.). Aira chinensis, Retz. Obs. iii. 10.—Tricholæna, Wall. Cat. n. 8660.

RAJPOOTANA; Ajmeer and Oodeypore, Duthie. The DECCAN, Heyne, Wight .-

DISTRIB. Arabia, Cape Verd Islds.

Stems 6-18 in., tufted, stout or slender. Leaves 1-3 in., linear, acuminate, flat, and sheaths glabrous or hairy; ligule obsolete. Panicle 2-4 in., very narrow; branches and pedicels capillary, flexuous. Spikelets very variable in size, 1-1 in. olong; stipitiform callus gibbous, bearded; gl. I 1/4-10 in. linear-oblong, obtuse, concave spreading; II and III tumid below, subrostrate, awned below the acute or obtuse tip, nerves smooth or tubercled; awn very slender, not twisted, longer than the gl. or shorter, palea of III narrow, keels ciliate; IV very thin, margins often overlapping.—The great variability in the size of the spikelets is very deceptive. It is not known where in the Deccan Heyne's and Wight's specimens were collected.

11. OPLISMENUS, Beauv.

Weak grasses; stems decumbent below, leafy. Leaves thin, flat, ovate to lanceolate; ligule a ridge of hairs. Spikelets 1-fld., sessile or subsessile. fascicled on a simple terminal spike or on panicled spikes. Glumes 4. I short, 3-nerved, long-awned, awn straight; II short, awn short or 0; III longest, 5-nerved, paleate or not, empty; IV lanceolate, terete and with its palea hardened. Stamens 3, anthers linear. Styles distinct. Grain free within the glumes.—Species few, very variable.

Of the 30 or more reputed species of Oplismenus, Burmannii and compositus seem

to be the most distinct, for undulatifolius, though constant over wide areas, is only a form of compositus with the branches of the panicle represented by one or a few sessile or subsessile spikelets.

1. O. undulatifolius, Beauv. Agrost. 54; spikelets solitary or clustered in a simple terminal spike. Kunik Revis. Gram. i. 44, Enum. Pl. i. 139, Suppl. 101; Parlat. Fl. Ital. i. 123; Boiss. Fl. Orient. v. 442; Franch. & Sav. Fl. Japon. ii. 654; T. Nees Gen. Fl. Germ. Monoc. i. n. 28; Duthie Grass. N.W. Ind. 8. O. acuminatus, Nees ex Steud. Syn. Gram. 45. O. semulans, flaccidus & imbecillis, Roem. & Sch. Syst. ii. 487. O. semulus. Kunth Revis. i. 44. O. latifolius (error for undulatifolius) Herb. Strach. & Winterb.; Aitchis. Cat. Panjab Pl. 161; Duthie l. c. 8. 0. parvifolius, Kunth 45. O. setarius, Roem. & Sch. l. c. Orthopogon gonyrrhizus, Mig. Fl. Ind. Bat. iii. 443; Orth. hirtellus, æmulus & flaccidus, Br. Prodr. 194. Orth. setarius, Spreng. Syst. Veg. 306; Griseb. Fl. Brit. W. Ind. 545. Orth. undulatifolius, Spreng. Syst. i. 306; Reichb. Fl. Germ. Recurs. i. 23, Ic. Fl. Germ. i. t. 28. Orth. undulatus, Link Hort. Reg. Berol. i. 203. Panicum barbifultum, Hochst. Pl. Hohenack. n. 1279, ex Schlecht. in Linnwa, xxxi. 307. P. Burmauni, Schrenk Pl. Exsicc. Cent. iii. n. 68; Balb. Misc. Bot. i. 8. P. gonyrrhizum, Steud. l. c. 44. P. hirtellum, All. Fl. Pedem. ii. 240. P. imbecille, Trin. l. c. t. 191; Wulf. in Jocq. Collect. i. 263; Schrad. Fl. Germ. i. 242. P. setarium, Lamk. Ill. i. 170; Poir. Encycl. iv. 741; Pers. Syn. i. 82. P. undulatifolium, Arduin. Sp. Alt. 14, t. 4; Gaud. Agrost. Helvet. i. 28; Trin. Sp. Gram. Ic. t. 192; Koch Syn, Fl. Germ. Ed. ii, 892. P Setaria hirtella, Schult, Mant. ii, 276.

TEMPERATE HIMALAYA, alt. 6-9000 ft., from Kashmir to Sikkim. Khasia Hills, alt. 4-5000 ft., Niighibi Hills.—Distrib. Central and S. Europe, warm

regions generally.

Stem 1-2 ft., usually very slender, simple or branched below. Leaves 1\frac{1}{2}-6 by \frac{1}{2}-1 in., from ovate to narrow lanceolate, finely acuminate, glabrous or sparsely hairy; sheaths glabrous or hirsute. Spike 2-5 in.; rachis glabrous or pilose with apreading hairs; lower clusters of spikelets rarely produced into a very short spike. Spikelets \frac{1}{2}-\frac{1}{2} in. (excl. awns), solitary with a second reduced to an awn, or clustered, glabrous or nearly so. Gl. I 3-nerved, ciliate; awn \frac{1}{2} in. or less; II usually awned, 5-nerved; III acute or shortly awned, 7-nerved, palea narrow or 0.—Though as observed under the genus, this grass is only a form of compositus, it keeps its characters of the inflorescence throughout its distribution, and may hence be regarded as distinct. The Nilghiri form (acuminatus, Nees) has very narrow leaves, 3-4 by \frac{1}{2} in. It is remarkable that no specimen of this species should exist in the Wallichian Herbarium.

2. C. compositus, Beauv. Agrost. 54; stem usually tall from a decumbent base, leaves 2-7 in. lanceolate, spikes 4-10 1-6 in. long or more, spikelets usually loosely imbricate, awns rather stout pale or dark. Kunth Enum. Pl. i. 141; Trin. Sp. Gram. Ic. t. 183, 189, 190; Benth. Fl. Austral. vii. 491; Trim. Cat. Ceyl. Pl. 105; Aitchis. Oat. Punjah. Pl. 161; Duthie Grass. N.W. Ind. 81. O. brasiliensis, Raddi Agrost. Bras. 40. O. bromoides, Baker in Journ. Linn. Soc. xxi. (1885) 452. O. Burmanni, Thw. Enum. 358; Hochst. Pl. Hohen. n. 368 (non Beauv.). O. decompositus, Nees in Endl. Prodr. Fl. Norfolk. 19. O. elatior & loliaceus, Beauv. l.c.; Kunth l.c. 142. O. hirtellus, Roem. & Sch. Syst. ii. 481. O. indicus, Willd. in Act. Acad. Nat. Cur. iv. 224. O. Jacquini, Kunth Revis. Gram. is 44, 45, Enum. i. 140, 146. O. lanceolatus, Kunth ll. cc. 45, 146; Wall. Oat. n. 8676; Dalz. & Gibs. Bomb. Fl. 292. O. latifolius, Hænke ex Steud. Nom.

Ed. II ii. 220. O. pratensis, Schult. Mant. ii. 597. O. sylvatious, Roem. & Sch. l.c. 481; Kunth Revis. i. 44, Enum. i. 139, Suppl. 101. Orthopogon compositus, Br. Prodr. 194; Miq. Fl. Ind. Bat. iii. Orth. Junghuhnii, Nees ex Miq. l.o. 444. Orth. longeracemosus & sylvatious, Miq. l.c. Orth. pratensis, & loliaceus, Spreng. Syst. i. 306. Orth. remotus, Trin. Fund. Agrost. 181. Panicum aristatum, Retz. Obs. v. 17. P. bidentatum & certificandum, Steud. l. c. 44, 45. P. compositum, Linn. Sp. Pl. 57; Trin. Sp. Gram. Ic. t. 187; Steud. l. c. 44; Thw. Enum. Pl. Zeyl. 379; Benth. Fl. Hongk. 411; Baker Fl. Maurit. 439. P. composito-proximum, Rottl. Ges. Naturf. Fr. Neue Schrift. iv. (1804) 224. P. elatius, Linn. f. Suppl. 107. P. lanceolatum, Retz. Obs. v. 17; Roxb. Fl. Ind. i. 294; Steud. l.c. 48. P. longeracemesum, Steud. l.c. 45. P. peninsulanum, Steud. l.c. 44. P. sylvaticum, Lamk. Encycl. iv. 733; Trin. Sp. Gram. Ic. t. 190 A.; Steud. l.c. 45. P. undatum, Steud. Nom. Ed. II. ii. 264. P. unguindsum, Herb. Banks ex Roxb. Fl. Ind. i. 294. Echinochloa lanceolata, Roem. & Sch. l. c. 476. PE. hirta, Schult. Mant. ii. 270. Hekaterosachne elatior, Steud. l.c. 118. Digitaria composita, Willd. Enum. Berol. i. 91. Notul. iii. 43.

Throughout INDIA, from Kashmir to Upper Assam, Munnepore, and Burma (up to 8000 ft. in Sikkim) and southward to the Andaman and Nicobar Islds.,

Penang and CEYLON.—DISTRIB. most trop. regions (except Australia).

Stem 1-3 ft., stout or slender, branched from the base and sometimes upwards. Leaves very variable, 1\frac{1}{2}-1\frac{1}{2} in. broad; sheaths glabrous, pilose or hirsute. Racemes 2-6 in., stout or slender; rachis glabrous, pilose or hispid; spikes \frac{1}{2}-3 in. long, erect or spreading, green or purplish. Spikelets \frac{1}{2}-\frac{1}{2} in. (excl. awns) solitary or in rather distant pairs or fascicles, appressed to the rachis or spreading, glabrous or with few or many bristles longer than the glumes at the base, rarely softly heiry; gls. pale green or reddish purple, I short, 3-nerved, ciliate, awn \frac{1}{2} in. to nearly \frac{1}{2} in., slender flexuous, pale yellowish or dark stouter and stiff; II longer or shorter than I, 5-7-nerved, acute, awn much shorter than of I or 0; III longer and broader than II; III acute or obtuse, 7-9-nerved, tip hispid, palea narrow or 0; IV lanceolate, terete, acuminate, and its hardened palea yellowish shining.—I am unable to group the Indian form of this most variable grass under practicable varieties. The following are indications of prevalent states, of which 6 is very aberrant.

1. Tall, stout, leaves 4-6 in., sheaths glabrous or hirsute, spikes and stout rachis of panicle more or less hirsute with long cilia, stout dark purplish awns often black. Wall. Cat. 8676 D. G. A. (left-hand specimen). Pan. elatius, Heyne & P. decompositus, Nees, in Herb. Wight n. 222, 1651. Andropogon undatus, Jacq.—Sikkim,

Assam, Silhet, Burma and the Deccan.

2. Dwarf, branches short stout decumbent, leaves \(\frac{1}{4}\) in. ovate green or purplish, sheaths hirsute, panicle erect, spikes erect stout glabrous or pubescent, and spikelets green or purple, awas short \(\frac{1}{4}\) in. stout.—Outh forests, Assam, Chittagong.

3. Slender, leaves 2-3 in., ovate-lanceolate, sheaths hirsute, paniele long very slender drooping rachis and very slender spikes finely pubescent, spikelets distant

subsilky, awns very slender.—Sikkim alt. 1-3000 ft. Munnepore 4750 ft.

4. Tall, stout and much branched, or slender, leaves 4—7 in. lanceolate, sheaths glabrous, spikes many long stout or slender erect or drooping, rarely dark-colrd., spikelets rather distant very many glabrous or sparingly setose at the base, awn stout or slender. O. lanceolatus, Kunth, Wall. Cat. 8676 A. B. C. H. L. O. compositus, Kunth, &c.—The commonest form.

5. Same as 4, but always slender, with glabrous sheaths and rachis of panicle, fewer very slender smooth spikes, with few distant quite glabrous spikelets, awas slender pale. O. indicus, Wight Herb. n. 63, 1652 and lanceolatus, n. 2832. O. lanceolatus, Wall. Cat. 8676 E. F. M.—A reduced form of 4, and quite as

common.

- 6. Slender, diffusely branched below; spikes few, distant, very slender; spikelets few, silkily villous, pale green, gl. I 3-5-nerved; II 5-7-nerved; III 7-9-nerved, its palea narrow tip ciliate.—Of this there are three forms or varieties, a, stem 2 ft., rather stout, leaves 3-4 in. linear-lanceolate, spikes 2-3 in., awns \(\frac{1}{2}\) in.—Penang, Curtis, n. 1102.—b, Very slender, leaves 1-1\(\frac{1}{2}\) in., awns shorter. O. indicus, Wight Cat. n. 1652.—Ceylon, Thwaites (CP. 3963)—c. very slender, leaves \(\frac{3}{2}\)-1 in., spikes 2-3, short, gl. I as long as its awn.—Ceylon, Thwaites (CP. 3964).
- 3. O. Burmannii, Beauv. Agrost. 54; decumbent, flaccid, leaves 1-1 in., spikes 3-5 short, spikelets secund closely imbricate awns pale capillary. Roem. & Sch. Syst. ii. 484. Kunth Revis. Gram. i. 44, Enum. i. 139, Suppl. 101; Trin. Sp. Gram. Ic. t. 193; Dalz. & Gibs. Bomb. Fl. 291; N.E. Br. in Gard. Chron. (1886) ii. 776; Franch. & Sav. Enum. Pl. Jap. ii. 160; Wight Cat. n. 1650; Duthie Grass. N.W. Ind. 8, Indig. Fodd. Grass, t. 47, Fodd. Grass. N. Ind. 13. O. africanus, Beauv. Fl. Owar. ii. 15, t. 68, f. L; Kunth Enum. i. 141. O. albus, Roem. & Sch. Syst. ii. 890. O. brasiliensis, Raddi Agrost. Bras. 400. O. bromoides, Beauv. Agrost. 54; Bojer Hort. Maurit. 366. O. Humboldtianus, Nees Agrost Bras. 264; Presl Rel. Hænk. i. 322. PO. indicus, Roem. & Sch. l.c. 484; Duthie Grass. N.W. Ind. 8. Orthopogon Burmanni, Br. Prodr. 194; Mig. Fl. Ind. Bat. iii. 442; Reichb. Ic. Fl. Germ. i. t. 28. Orth. albus, Nees ex Steud. l.c. 44; Mig. l.c. Panicum Burmanni, Retz. Obs. iii. 10; Roxb. Fl. Ind. i. 298; Trin. Sp. Gram. Ic. t. 193; Baker Fl. Maurit. 438. P. album & africanum, Poir. Encycl. Suppl. iv. 274, 275. P. bromoides, Lamk. Ill. i. 170, Encycl. iv. 742. P. hirtellum, Burm. Fl. Ind. 24, t. 13, f. 1 (non Linn); Steud. l.c. 44. P. japonicum, Steud. in Flora xxix. (1846) 18. P. multisetum, Hochst Pl. Schimp. Abyss. p. 1469; A Rich. Tent. Fl. Abyss. ii. 377. Echinochloa hirtella, Schult, Mant. ii. 269.—Oplismenus, Wall. Cat. 8677. 8678.

PLAINS OF INDIA, from Rohilkund to Bengal, Silhet and Chittagong, ascending the Himalaya in Sikkim to 5000 ft. Behab and Central India, Ceylon, Jaffna (Herb. Rottl.); Forguson.—Distrib. Malay Islds., China, Japan, Afr. trop.

Diffusely branched and rooting below, stems often almost filiform. Leaves always small, sheaths glabrous or hairy. Paniols 1-4 in., inclined or nodding; spikes rarely 1 in., very pale, rachis glabrous or pubescent. Spikelets $\frac{1}{10} - \frac{1}{2}$ in. (excl. awns); gl. I ciliate, 1-3-nerved, awn $\frac{1}{2}$ in. or less; II 3-5-nerved, awned; III 5-9-nerved, shortly awned, pales 0.—Usually very distinct from O. compositus, but I have found specimens growing in the Jheels, with spikes nearly two inches long and stouter awns, forming a transition to that plant. Wall. Cat. 8678 is a very small Silhet form, with ovate leaves $\frac{1}{2} - \frac{1}{2}$ in. Clarke found it also in Silhet.—O. africanus is the earliest name for the species under Oplismenus, but Burmannii is of universal adoption, and is the earliest specific name; both were given by Beauvois, O. africanus in 1807, O. Burmannii in 1812.

DOUBTFUL SPECIES.

O? DUBIUS, Kunth Revis. Gram. i. 44; Enum. Pl. i. 143.

12. ARUNDINELLA, Raddi.

Annual or perennial erect grasses. Leaves narrow. Spikelets panicled, not jointed on the pedicels, 1-2-fid. Glumes 4, membranous or subcoriaceous, I ovate acute or acuminate, rather shorter than II, 3 or 5-nerved; II lanceolate or ovate-lanceolate, acuminate or subaristate, 5-rarely 7-nerved;

III equalling I or rather longer, oblong, subacute or narrowly truncate 5-or 7-nerved, paleate, triandrous or neuter; IV much the smallest, bisexual, articulate at the base and deciduous, membranous and oblong in flower, lanceolate subcoriaceous and scaberulous when mature, and awnless or with one terminal subgeniculate awn more or less twisted at the base, and with sometimes 2 lateral shorter capillary awns; base usually bearded. Anthers long. Styles 2, free or connate below; stigmas long. Grain free within gl. IV.—Species about 30, tropical.

A very well marked genus, referred by Baillon (Bull. Soc. Linn. Paris (1893) 1023, 1083, 1093) to Panicum, from which it differs in the inarticulate spikelets with the small thin gl. IV articulate at the base, as also in gl. IV being awned in many species and bearded at the base. The species are most difficult of determination, the Peninsular especially, which have not been so collected as to provide sufficient material for satisfactory study. I greatly doubt the value of the characters afforded by the awns.

- * Gl. IV with 3 awns, the lateral short, capillary. (MILIOSACCHARUM, Necs.)
- 1. A. avenacea, Munro ex Thw. Enum. Pl. Zeyl. 362; annual, leaves short, panicle \(\frac{1}{2}\)-1 in. ovoid compact, spikelets \(\frac{1}{2}\)-\(\frac{1}{2}\) in. subsessile, gl. I and II awned, III awned acuminate, IV hispid or bearded, median awn flattened and strongly twisted at the base. Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 345; Trim. Cat. Ceyl. Pl. 106. A. Campbelliana, Lisboa l.c. 346. Avena malabarica, Heyne ex Herb. Rottl.—Arundinella? Wall. Cat. 8670.—Aira, No. 3, Griff. Notul. iii. 55, Ic. Pl. Asiat. t. 146, f. III.

KHASIA HILLS, in wet places, alt. 3-4000 ft. Griffith, &c. DECCAN PENINSULA, from the Concan southward. BURMA; Pegu, Rurs; Moulmein, Griffith.

CEYLON, in swamps, at Ratnapqora, Thwaites.

- A weak straggling slender grass. Leaves 1-2 in., ovate-lanceolate, acute, glabrous or pilose, base amplexic ul and subpectinately ciliate; sheaths slender; ligule membranous, ciliate. Paniele pale green, branches short glabrous or hairy. Glumes I and II glabrous hairy or with tubercled-based bristles; I 3-5-nerved; II \(\frac{1}{2}\) longer, 5-nerved; III acute or acuminate, 5-nerved, paleate, male or neuter; IV linear-oblong, more or less hispidly pilose or with lateral beards, base with long hairs; lateral awns triangular at the base, median about twice as long as the spikelet, geniculate above the twisted portion.
- 2. A. tuberculata, Munro ex Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 344; annual, erect, hispid with long white tubercled-based hairs, panicle lax, spikelets in. shortly pedicelled, gl. I 3-nerved shortly awned, II nearly twice as long 5-nerved narrowed to a long beak, III male obtuse, IV glabrous, median awn slender twisted or not below.

The Concan; Poona, Stocks, &c. Centeal India, King.

Stem 12-18 in., sheaths leaves and panicle clothed with white spreading stiff hairs. Leaves 1-3 in., linear-lanceolate, base rounded; ligule a ridge of hairs.

Panicle 8-6 in., narrowly oblong; branches 1-1 in., suberect, scaberulous. Spikelets ovoid, single or geminate, beak of gl. II as long as the rest of the gl.; III as long as I, narrow, glabrous, 5-nerved; IV lanceolate, scabrid when ripe, base pilose, median awn about twice as long as the spikelet, lateral accular.

3. A. mesophylla, Nees ex Steud. Syn. Gram. 115; Nees & Arn. ex Wight Cat. n. 2347; annual, erect, pubescent or hirsute, leaves narrow, branches of compressed panicle spiciform short simple, spikelets sessile imbricate sub 4-ranked bifarious, gl. I. subawned 3 nerved, II rather longer

5-7-nerved, narrowed into a long beak, III obtuse male, IV lanceolate base pilose, median awn about \(\frac{1}{3}\) longer than the spikelet slender hardly twisted.—Arundinella, Wall. Cat. n. 8663 B.

TRAVANCOB: Pulney Mts. and Courtallam, Wight.

Stem 1-2 ft., branching from the base, slender. Leaves 3-4 by \(\frac{1}{4}\) in., base narrowed; ligule obscure. Panicle 2-4 in., hirsute, branches \(\frac{1}{2}\)-\(\frac{1}{2}\) in., sessile (i.e. flowering to the base), rachis hairly; spikelets distichously spreading. Gl. I hardly awned, ovate; II about \(\frac{1}{2}\) longer, lanceolate; III glabrous, narrowly oblong; IV not seen ripe, base bearded.

4. A. nervosa, Nees in Wall. Cat. n. 8662; annual, leaves narrow, softly hairy with spreading hairs, panicle much branched, branches capillary laxly many-fid., spikelets in pedicelled, gl. I acuminate 3-nerved, II nearly twice as long 5-nerved narrowed into a long straight beak, III obtuse, IV ovate-lanceolate scaberulous, median awn slender. Steud. Syn. Gram. 115; Wight Cat. n. 2387, 1669 α β γ. Holcus nervosus, Roxb. ex Wight Cat. n. 1669 (non Roxb. Fl. Ind.) Ischemum melicoides, Koen. ex Might Cat. n. 1669 (non Roxb. Fl. Ind.) Ischemum melicoides, Koen. ex Ind. Agrostis scoparia, Koen. ex Steud. l. c. Anemagrostis Neesiana, Wight & Arn, ex Steud. l. c.—Arundinella, Wall. Cat. n. 8665.

SOUTHERN DECCAN PENINSULA; Heyne, Wight, &c.

Stem 12-18 in., slender, branched from the base. Leaves 4-8 by \(\frac{1}{2}\) in., and sheaths usually copiously hairy on both surfaces with long white spreading hairs, base narrow; ligule membranous, ciliate. Panicle 6-10 in.; branches 2-4 in., fascicled and whorled, erect, flexuous, smooth, glabrous. Spikelets suberect, glabrous or nerves of gl. I and II more or less setose; gl. III neuter or male; IV slightly bearded at the base, median awn more or less twisted at the very slender base.—Wight's \(\beta\) laxior (Cat. 1669 b) is only a slender form.—Lisboa (in Journ. Bomb. Nat. Hist. Soc. v. (1891) 344) gives Concan, Coromandel and Ceylon as habitats, but without seeing specimens it is not safe to cite an authority in so difficult a genus. A. nervosa, Duthie Grass. N.-W. Ind. 13, from the Himalaya is probably one of the forms of brasiliensis.

5. A. setosa, Trin. Diss. ii. 63, Panic. Gen. 245; perennial, tall, leaves usually narrow, panicle 6-12 in., branches subsolitary slender erect laxly many-fld., spikelets \(\frac{1}{2}\)-\frac{1}{2} in. subsecund pedicelled, gl. I and II aristately acuminate glabrous or setose, I = \(\frac{1}{2}\)-\frac{1}{2} II 3-nerved, II elongate lanceolate 5-nerved, III shorter obtuse or subacute 5-7-nerved, IV = \(\frac{1}{2}\) III lanceolate scaberulous. Steud. Syn. Gram. 114; Duthie Grass. N.W. Ind. 13. A. hirsuta, Nees ex Steud. l. c. 115, \(\frac{1}{2}\) Hochst. in Hohen. Pl. Ind. Or. n. 920. A. setifera, Steud. l. c. 115. A. stricta, Nees in Hook. Kew Journ. ii. (1850) 102; Dalz. \(\frac{1}{2}\) Gibs. Bomb. Fl. 292. Milium cimicinoides, Roxb. mes.—PArundinaria sp. nov. Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 343.

WESTERN HIMALAYA; alt. 5-8000 ft., from Dalhousie to Nepal, Wallich, &c. Khasia Hills, alt. 8-6000 ft. Behar, on the Soane river, J. D. H. CENTRAL INDIA, Clarke. Nilghiei Hills, alt. 6000 ft., Schmidt, &c. Ceylon; at Trin-

comalee, Ferguson.—DISTRIB. Tonkin, China, Philippines.

Stems densely tusted on a hard rootstock, 1-3 ft., stout or slender, leafy. Leaves 6-10 in., convolute, glabrous pubescent or villous; ligule obscure. Pasicle 2-6 in., sometimes corymbiform; branches 2-5 in., usually naked below. Spikelets often in pairs, pedicels with sometimes a few hairs near the tip. Median asm &f gl. IV about as long as the spikelet.—The name hirsuta is attached to a specimen in Herb. Royle, so named no doubt by Nces.

6. A. khaseana, Nees ex Steud. Syn. Gram. 115; tall, robust, leaves narrow, panicle 6-18 in. branches long or short erect scabrid, spikelets \(\frac{1}{2}\) in. setose with long tubercled based bristles, gl. I and II aristately acuminate, I = \(\frac{3}{4}\) II 5-nerved, III 5-nerved, III acuminate or subaristate, IV oblong-lanceolate nearly smooth. Arundinella? Wall. Cat. n. 8672.

KHASIA HILLS; alt. 4-6000 ft., common.

Stem 3-6 ft., from a woody tufted rootstock, as thick as a swan's quill or less, nodes pubescent or bearded. Leaves 6-12 in., and sheaths glabrous pilose or villous; ligule a ridge of hairs. Panicle effuse or contracted or thyrsiform; branches 1-6 in. long. Spikelets pedicelled, crowded or distant, dark green; gl. IV. with the median awn variable in length, strongly twisted at the stout base, lateral awn short.

- ** Awn solitary, longer than the spikelet.
- † Spikelets about 13-10 in. long.
- 7. A. agrostoides, Trin. Sp. Gram. Ic. t. 265; annual, villous or glabrescent, leaves broad flat flaccid, panicle contracted, branches fascicled suberect, spikelets glabrous or setose, gl. I = \frac{1}{2} 11 ovate acuminate 3-5-nerved, II subaristately acuminate 5-nerved, III subacute 3-5-nerved, IV oblong-lanceolate scabrid. Steud. Syn. Gram. 116. A. holocides, Trin. in Bull. Sc. Acad. Petersb. i. (1836) 71. Brandtia holocides, Kunth Revis. Gram. ii. 129, t. 170; Steud. l. c.—Arundinella? Wall. Cat. n. 8671.

SOUTH DECCAN, and the CONCAN, &c., Wight, &c. TENASSBEIM, Wallick,

Helfer .- DISTRIB. Philippines.

Stem 6-18 in., stout or slender. Leaves 1-4 in., up to \(\frac{1}{2}\) in. broad, narrowed to the base, and sheaths usually clothed with long soft hairs; ligule a ridge of hairs. Passicle 1-9 in., always contracted; branches \(\frac{1}{2}\)-1 in., capillary, subcrect, sparingly divided; gl. I and II rarely without bristles; III male or neuter; column of awn exserted, twisted.

Var. ciliata; panicle more copiously setose, spikelets rather larger. Arundinella ciliata, Nees in Wight Cat. n. 1666. A. pilosa, Hochst. in Hohen, Pl. Ind. Or. n. 647 & 985; Miq. in Verh. Nedel. Ind. iii. iv. (1851) 30. Holcus ciliatus, Roub. Fl. Ind. i. 318. Andropogon paniceus, Heyno ex Wall. l. c. 4 in Herb. Rottl. Perotis polystachya, Herb. Heyno ex Wall. l. c. The Deccan Peninsula, from the Concan southward. Moulmein, Griffith.—Arundinella, Wall. Cat. n. 8684.

8. A. tenella, Nees ex Steud. Syn. Gram. 115; annual, glabrous, leaves flaccid lanceolate, panicle very large effuse copiously branched, rachis and branches capillary spreading, spikelets \(\frac{1}{2} \) \(\frac{1}{2} \) in solitary long-pedicelled glabrous or sparsely setose, gl. I = \(\frac{3}{2} \) III 3-nerved, II ovate-lanceolate acuminate 5-nerved, III 5-nerved, IV oblong, awn twice as long as the spikelet. Wight Cat. n. 1668; Dalz. & Gibs. Bomb. Fl. 292; Duthie Grass. N.W. Ind. 13; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 345. A. pumila, Steud. l. c. 114; Lisboa l. c. Acratherum pumilum, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 414, t. 100. Anemagrostis tenella, Wight ex Steud. l. c.

WESTERN HIMALAYA; Garwbal, alt. 4000 ft. RAJPOOTANA, on Mt. Abu, &c. Behar and Central India, alt. 8-4000 ft. The Khasia Hills, the Concan

and PEGU.-DISTRIB. Abyssinia.

Stem 6-20 in., erect, soft, leafy, very sparsely hairy. Leaves from ovate and 2-4 in. long, to linear-lanceolate and 14 in. long, often ‡ in. broad, acuminate, membrahous, many-nerved, base narrow; sheath rarely hairy; ligule short, hairy. Panicle 2-10 in.; rachis slender, strict, erect; branches alternate or the lower

subverticillately fascicled, each with widely spreading capillary branches and branchlets. Spikelets the smallest of the genus, usually shorter than their capillary pedicels; gl. 1V scabrid above; column of awn slightly twisted.

9. A. pygmea, Hook. f.; annual, very small, slender, leaves chiefly radical narrow hispidly hairy nerveless except the midrib margins serrulate, panicle erect effuse, branches few capillary, spikelets few $\frac{1}{18}$ in. setose, gl. $I = \frac{2}{3}$ II ovate acute 3-nerved, II ovate-lanceolate long-acuminate 5-nerved, III obtuse obscurely 5-nerved, IV oblong truncate, awn twice as long as the spikelet.

NORTH CANARA, Lisbon.

Whole plant 6 inches high and very slender.—Closely allied to A. tenella, but very much smaller, with very slender stem, narrow chiefly radical leaves $1-1\frac{1}{2}$ in. by $\frac{1}{10}$ in., sparsely clothed with long bristles, and a very sparingly divided panicle with few larger spikelets on very long capillary pedicels.—The specimens are very poor, and the character given may hence require modification.

10. A. Metzii, Hochst. ex Miq. in Verh. Ned. Inst. III lv. (1851) 31; tall, glabrous, leaves linear, panicle 3-10 in. effuse erect or inclined branches alternate or fascicled elongate, spikelets $\frac{1}{12}, -\frac{1}{10}$ in. subsecund, long or short pedicelled glabrous or sparsely setulose, gl. $1 = \frac{3}{2}$ II ovate acuminate 3-nerved, II ovate-lanceolate acuminate 5-nerved, III acute 5-7-nerved, IV oblong truncate obtuse or retuse scaberulous, awn about twice as long as the spikelet. Steud. Syn. Gram. 116 (excl. Syn. Roxb.); Hochst. in Herb. Hohenack. n. 257. A. agrostoides, Trin. var. tenella, Herb. Ind. Or. Hf. $\frac{3}{2}$ T. Agrostis fusca, Heyne ex Wall. Cat. $\frac{3}{2}$ in Herb. Rottler.—Arundinella, Wall. Cat. n. 8668.

NILGHIRI HILLS; the Wynaad, Heyne. The CONCAN and CANARA, Law, Mets, Thomson, Woodrow, &c.

Annual? 1-3 ft. high. Leaves 4-6 by \(\frac{1}{4}\) in., scaherulous and sheath more or less hairy or glabious. Panicle 1-8 in.; rachis slender, smooth or subscaherulous; branches 1-4 in., uniformly flowering. Spikelets green or purplish, solitary or 2-nate, longer or shorter than their pedicels which are sometimes \(\frac{1}{2}\) in. long; gl. I nerves sometimes scabrid; lV very obscurely bearded at the base, awn straight.—Hohenacker's specimens appear to be annual, Heyne's have a small hard rootstock. This is certainly not Roxburgh's Holcus nervosus, which Steudel cites for it. The panicle varies greatly in length, breadth and composition; in small specimens it is short and triangular with spreading nearly simple branches, in taller it is more effuse with long flexuous branches and much longer pedicels.

†† Spikelets more than 10 in. long.

11. A. villosa, Arn. ex Steud. Syn. Gram. 115; stems tufted villous below the very narrow panicle, rachis villous, branches spiciform short simple hirsute, spikelets \(\frac{1}{4}\) in secund crowded setosely hirsute, gl. I = \(\frac{3}{4}\) II ovate acuminate 3-5-nerved, II subaristately accurate 5-nerved neuter or male, IV oblong-lanceolate very minutely seaberglous, awn not twice-as long as the spikelet. Thw. Enum. Pl. Zeyl. 362; Trim. Cat. Ceyl. Pl. 106.

EASTERN HIMALAYA, the KHASIA HILLS, CENTRAL INDIA, the DECCAR PENIN-

SULA & CEYLON.

Stem 12-16 in., slender, stiff, leafy at the villous base. Leaves 4-8 by \(\frac{1}{12} \) \(\frac{1}{16} \) in., strict, rather rigid, glabrous tomentose or villous; ligule of long hairs. Parties 2-4 in., speciform; branches \(\frac{1}{2} \) \(\frac{1}{10} \), brown. Spikelets subdistichously crowded, spreading or erect; column of awn included twisted.—Nees, according to Steudel, describes gl. IV. as 2-toothed. I find it to be usually rounded at the tip, but 2-toothed in

var. kimalaica. Gl. III is more acute than is usual in the genus and its pulea larger.

Var. Wightii; leaves very narrow convolute, basal sheaths woolly.

Var. Heyne; taller, stouter, basal sheaths nearly naked, leaves longer broader and flat 12 by 1 in., panicle 4 in. long. Andropogon paniceus, Herb. Heyne es Wall. Cat. n. 8663 A.—Courtallam, Wight.

Var. himalaica; basal sheaths naked, leaves 2-6 by 1-1 in. flat, spikes sometimes shortly peduncled, gl. IV 2-toothed. A. Hookerii, Munro me.—Bhotan, E.

Nepal and Sikkim Himalaya, alt. 6-11,000 ft., Griffith, J. D. H., Clarke.

12. A. birmanica, Hook. f.; annual, stout, stem glabrous, leaves linear-lanceolate flat hirsute, panicle linear-oblong interrupted, branches sessile simple or sparingly divided, rachis ciliate and scaberulous, spikelets t-\frac{1}{2} in. densely crowded subsessile glabrous or with a few setae, gl. I = \frac{3}{2} II ovate subaristately acuminate 5-nerved, II ovate-lanceolate long-acuminate 5-nerved, III acute 5-nerved, IV oblong-lanceolate scabrid, awn not twice the length of the spikelet.

BURMA; Rangoon, M'Lelland, Scott, Kurs.

Stem tufted, 1-2 ft., stout, soft, leafy, nearly as thick as a goose-quill, nodes bearded. Leaves 4-8 by \frac{1}{2} in., base subcordate, sheath hirsute; ligule a narrow ciliate membrane. Pantcle 3-7 in., very pale, branches or spikes 1-2 in sessile, erect; gl. III male female or neuter, awn of IV with twisted included column.—Near A. villosa, but annual, with soft stems and leaves much smaller and hardly setose spikelets, stem glabrous below the panicle.

13. A. brasiliensis, Raddi, Agrost. Bras. 37, t. i. fig. 3; stem erect stout or slender, leaves broad or narrow, panicle pyramidal subcorymbose or thyrsiform sparingly or copiously branched, spikelets 1-1 in. subsecund longer than their pedicels usually quite glabrous, gl. I = 1 II ovate-lanceolate acuminate 3-nerved, II lanceolate finely acuminate 5-nerved, III subacute 5-nerved. IV oblong-lanceolate acute scaberulous, awn twice as long as the spikelet. Trin. Dies. ii. 62, Panic. Gen. 246, Sp. Gram. Ic. t. 266; Doell in Mart. Fl. Bras. ii. II, 298, t. 38. A. Ecklonii, Nees Fl. Afr. Austr. 80. A. martinicensis, Trin. Diss. ii. 62; Panic. Gen. 246; Griseb. Fl. Brit. W. Ind. 556. A. Mikani, Nees Agrost. Bras. 465. A. nepalensis, Trin. Diss. ii. 62; Panic. Gen. 335, Sp. Gram. Ic. t. 268; Duthie Grass. N.W. Ind. 13; Steud. Syn. Gram. 115; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891). 343. A. pallida, Nees Agrost. Bras. 465. A. rigida, Nees Fl. Afr. Austr. 80. A. Ritchiei, Munro ex Lisboa l. c. A. stricta, Nees in Hook. Kew Journ. ii. (1850), 102; ? Dalz. & Gibs. Bomb. Fl. 293. Acratherum miliaceum, Link Hort. Berol. i. 320. Orthopogon agrostoides, Trev. ex Steud. Nom., Ed. 11. ii. 234. Aira brasiliensia, Spreng. Syst. Veg. i. 278. Golubachia Mikani, Trin. in Spreng. Neue Entdeck. ii. 81. lschwmum hispidum, H. B. & K. Nov. Gen. & Sp. i. 194; Kunth Revis. Gram. i. 373, t. 100; Enum. Pl. i. 515. Riedeliea Mikani, Trin. ex Kunth Enum. l.c. Holous nervosus, Roxb. Fl. Ind. i. 318. Thysanachne scoparia, Presl Nov. Pl. Gen. Digs. 1829, cum Ic. Rel. Hank. i. 253. Andropogon hispidus, Willd. Sp. Pl. iv. 908. A. P. epiphyllus, Wall. Cat. n. 8667 A. A. virens, Spreng. Syst. i. 287 .-Airacea, Griff. Notul. 58, Ic. Pl. Asiat. t. 141, f. 11 .- Arandinella, Wall. Cat. n. 8666, 8667.

Throughout the hilly parts of India, from the Himalays, ascending to 7000 ft., to Burma and Childh.—Distric. Chine, Malaga, Australia, S. Africa, trop. America.

Perennial; rootstock stout, hard, creeping and sending out stout sheathed branches sometimes as thick as a goose-quill, or tuited and intricately branched.

Stems 1-5 ft., from the thickness of a sparrow's to a goose quill, simple or branched, nodes glabrous or pubescent. Leaves 6-12 by 1-3 in., usually ciliate at the narrow base; ligule of soft hairs. Panicle 4-18 in.; branches 1-10 in., few or many, fascicled or subverticillate, densely or laxly imbricating, usually slender and undivided. Spikelets distant or crowded, green or purplish; gl. I sometimes very sparingly setose; III male or neuter, rarely imperfectly bisexual; IV always bearded at the base, column of awn more or less twisted.—An abundant grass in many parts of India, but so variable that it is difficult to formulate a character for it that will not include other species. Dr. Stapf has aided me in the examination of a mass of Indian specimens, including many hundreds collected by Clarke over the length and breadth of India; and especially in the more important matter of identifying A. nepalensis with the American A. brasiliensis, and various others here brought together as synonyms. The largest form is Wallich's 8666 A, with a stout creeping woody rhizome, sheathed surculi as thick as a goose-quill, a stout stem 5 ft. high, broad often hirsute leaves, and a large panicle 6-12 in. long of spikelets 1 in. long; it is a tropical and subtropical plant extending in the Himalaya from Kumaon eastward, and is common in the Khasia Hills. Wallich's 8666 B (from the Calcutta Bot. Gardens?) is a tall much more slender plant, with matted roots, very narrow leaves with tubercle-based hairs, and a slender thin panicle. His 3667 A. B. from Burma, is a tall plant with soft hairy leaves 1-1 in. broad, and an effuse subpyramidel panicle with fascicled capillary branches and smaller spikelets about 1 in. long. It is common throughout the lower Himalaya and Khasia Hills. Another variety, with a straggling branching rootstock, proliferously fascicled branches sheathed at the base, short or long glabrous or hairy linear-lanceolate leaves, and small oblong panicles with few slender branches and few spikelets, occurs at elevations of 4-6000 ft. Lastly, there is a common Himalayan slender form from the Panjab eastwards, six inches to a foot high, with tufted roots, very narrow leaves, a small oblong panicle, and small spikelets. A. Ritchiei, Munro, is a tall stout Concan form, 21 ft. high, with a shortly creeping rootstock, narrow obscurely hairy convolute leaves, a very narrow panicle, and pale small spikelets.

14. A. fuscata, Nees ex Buese in Miq. Pl. Jungh. 359; perennial, stout, rather short, leaves short flat hirsute, panicle oblong dense-fld. usually purplish, rachis stout pubescent or villous, branches crowded erect, spikelets $\frac{1}{8} - \frac{1}{6}$ in secund crowded sessile or shortly pedicelled glabrous or sparsely setose, gl. I = { II broadly ovate acuminate 3-5-nerved, II ovate-lanceolate acuminate 5-nerved, III obtuse or truncate 5-nerved, IV oblong-lanceo-late emarginate scabrid, awn short. Steud. Syn. Gram. 114; Wight Cat. n. 1667; A. purpurea, Hockst. ex Steud. 1. c. 115; PLisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 345. Acratherum fuscatum, Nees ex Steud. l. c.

The CONCAN (Lisbon). NILGHIBI HILLS, Heyne: Octacamund, alt. 6000 ft.,

Wight, Lawson, King. PEGU, at Rangoon, Kurs.

Stem 1-2 it., stiff, glabrous or pubescent below the panicle. Leaves 1-8 by 1-1 in., lanceolate, tapering from the base to the tip, corisceous, strongly nerved; sheath hirsute; ligule very short, ciliate. Panicle 2-5 in., erect; rachis and subsimple branches stiff, angular, scaberulous. Spikelets stouter and glume much broader than in any form of brassliensis.—Heyne's specimens are more slender than Lawson's. I have seen no specimens from the Concan. The Rangoon plant has a very pale panicle.

15. A. capillaris, Hook. f.; perennial, very slender, leaves narrow glabrous or hairy, panicle oblong branches alternate slender flexuous naked below, spikelets in. distant solitary glabrous shorter than their pedicels, gl. I = 3 II ovate-lanceolate acuminate 3-5-nerved, II lanceolate acuminate 5-nerved, III not exceeding I obtuse 5-nerved, IV lanceolate acute scabrid, awn about twice as long as the spikelet. A mutica, Nees ex Steud, Syn, Gram. 116; P Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891)

8. Andropogon capillaris, Herb. Heyne.—Arundinella sp., Wall. Cat. n. 8665 A.

The DECCAN, Heyne. PULNEY HILLS, Herb. Wight (n. 8338).

Stem erect from a tuberous rhizome which is clothed with the woolly bases of leaf-sheaths. Leaves 6-12 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., acuminate, base rather narrow; upper sheaths glabrous; ligule a ridge of hairs. Panicle 5-7 in., flexuous; rachis filiform, scaberulous; branches few, 4-6 in., naked below except a solitary long-pedicelled axillary spikelet; pedicels capillary.—An obscure plant. Nees describes the leaves as with sparsely setulose margins, and gl. IV as mucronate, from which it is evident that the awn has fallen away in his specimen. This latter suggested the name mutica, which, being misleading, I have replaced by Heyne's of capillaris. Wight's Pulney specimens have a slightly hairy panicle 3 in long, with more numerous close-set branches and closer spikelets. Lisboa (Journ. Bomb. Nat. Hist. Soc. v. (1890) 344) gives mutica as a common plant all over Bombay, but without seeing specimens I cannot confirm this.

16. A. laxifiora, Hook. f.; very slender, glabrous, leaves narrow, panicle effuse, branches spreading capillary solitary alternate or opposite or the lower fascicled, branchlets spreading, spikelets \(\frac{1}{2}-\frac{1}{2}\) in. solitary sborter than their capillary pedicels, gl. I = \(\frac{3}{2}\) II ovate acuminate 3-nerved, II ovate-lanceclate 5-nerved, III longer than I oblong acute, IV longer than III oblong-lanceclate scaberulous, awn 0 or shortly exserted. A. nervosa, Thw. Enum. Pl. Zeyl. 362 (excl. Syn.); Trim. Cat. Ceyl. Pl. 106.

CEYLON, Gardner; Central Province, alt. 3-5000 ft., Thwaites (C.P. 919).

Annual? glabrous. Stem 12-30 in., tufted, geniculately ascending, nodes glabrous. Leaves 4-8 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., finely acuminate; ligule narrow, membranous, ciliate. Passics 4-6 in., green. Gl. I scabrid on the keel or not; IV bearded at the base or not; column of awn twisted.—The open panicle with long capillary pedicels of the spikelet and quite acute gl. III which is \(\frac{1}{2}\) longer than I, characterize this species. One specimen (Gardner, n. 1007) has no trace of an awn.

- *** Awn 0, or very short and hardly exserted (see also A. laziflora).
- 17. A. Wallichii, Nees ex Steud. Syn. Gram. 114; perennial, stout, erect, panicle elongate contracted strict, branches 1-1½ in. stout stiff spiciform, spikelets 3-4-seriate ovoid secund densely imbricate very stoutly pedicelled setose, gl. I nearly = II ovate acute 3-5-nerved, III oblong obtuse 5-nerved, IV ovoid subacute nearly smooth, awn O or very short. Duthie Grass. N.W. Ind. 13. Panicum strictum, Road. Fl. Ind. i. 303. P. bengalense, Spreng. Syst. i. 311; Steud. Syn. Gram. 48. P. pyramidale, β? Herb. Ham. ex Wall. Cat. n. 8700.—Panicum, Wall. Cat. n. 8700.—Arundinella? Wall. Cat. n. 8669.

TROPICAL HIMALAYA; on dry banks from Simla to Sikkim, alt. 1-6000 ft. BENGAL, BENAL, the KRASIA, NAGA and SATPURA HILLS. BURMA; Shan Hills, Manders.—Distrib. Tonkiu.

- Stem 1-3 ft., from a woody creeping or tufted hard rhizome; nodes bearded or not. Leaves 12-18 by \(\frac{1}{2}-\frac{1}{2}\) in., all radical in small forms, glabrous hairy or villous, lauceolate, acuminate; sheath smooth scabrid or villous; ligule a ridge of hairs. Panicle ii-12 in. (the stoutest of the Indian species); branches \(\frac{1}{2}-\)1 in., lower sometimes whorled, erecto-patent, flowering to the base; rachis angular, scabrid. Spike-lets green or purplish; gl. IV naked at the base; awn not twisted.
- 18. **A. Clarkei**, Hook.f.; tall, very stout, leaves very long, panicle very large subcorymbiform, branches 3-8 in fascicled erect very slender simple upper much longer than the rachis, spikelets $\frac{1}{10} \frac{1}{8}$ in 1-2-seriate secund shortly pedicelled, gl. I = $\frac{3}{4}$ II ovate acute 5-nerved, II ovate-

lanceolate acute 5-nerved, III oblong obtuse, IV ovate-lanceolate, awn very shortly exserted base twisted.

SIKKIM TERAL Clarke.

Stem 6 ft. or more, stouter than a swan's quill above. Leaves 2-3 ft. by I in., coriaceous, hairy beneath; sheath long, margins fimbriate; ligule a ridge of heirs. Pasicle 12-18 by 4-6 in.; rachis stout, erect, angular, nearly smooth; branches rarely divided, filiform, scaberulous. Spikelets solitary or 2-nate, pale, usually longer than their pedicels.—The great size, large panicle with long branches, the upper far exceeding the rachis, will characterize this gigantic species.

19. A. leptochloa, Hook. f.; tall, slender, leaves harrow, panicle pyramidal or subcorymbiform often interrupted, branches short simple slender alternate whorled or fascioled, spikelets $\frac{1}{10}$ in 1-2-seriate secund. sessile or pedicelled glabrous, gl. I = $\frac{3}{4}$ II ovate acuminate 3-nerved, II ovate-lanceolate acuminate 5-nerved, III ovate-oblong subacute 5-nerved, IV lanceolate scaberulous base naked, awn minute or 0. Panicum leptochloa, Nees ex Steud. Syn. Gram. 62; Wight Oat. n. 1621; Steud. Syn. Gram. 62; Thw. Enum. Pl. Zeyl. 360; Trim. Cat. Ceyl. Pl. 105. P. zeylanicum, Arn. mss. Leptochloa f panicoides, Herb. Wight, n. 125, ex Steud. l. c. L. pectinata, Steud. l. c.

MALABAB; at Quilon, Wight, CEYLON, not uncommon, Thwaites.

Stem 2-4 ft., from a woody rootstock, as thick as a crow-quill or less; nodes glabrous. Leaves 6-10 in., rarely \(\frac{1}{2}\) in. broad, glabrous or hairy; sheath smooth or hairy; ligule obscure. Panicle 2-14 in., rachis faintly scaberulous; branches 1-4 in., suberect, rarely spreading, slender, not flexuous; axils bearded or ciliate. Spikelets rarely longer than their pedicels; gls. thin, nerves of I scabrid.

Var. gracillima; more slender, leaves narrower, paniele pyramidal, branches alternate very distant, spikelets more distant very shortly pedicelled.—Cochin,

Johnstone, in wet places. Nilambar, Lawson.

20. A. Lawsoni, Hook. f.; tall, stout, leaves linear-lanceolate acute scabrid above, panicle tall pyramidal, rachis scabrid, branches fascicled or subverticillate erecto-patent filiform strict simple or lower branched, spikelets in solitary or 2-nate glabrous about equalling their pedicels, gl. I = i II ovate acuminate 3-5-nerved, II ovate-lanceolate acuminate 5-nerved, III obtuse 5-7-nerved, IV lanceolate scaberulous base naked, awn 0.

NILGHIBI HILLS; in swamps at Goodaloor, alt. 3000 ft., Lawson.

Stem erect, 3-4 ft. high, nearly as thick as the little finger below. Leaves, lower few, 8-12 by \(\frac{1}{2}\) in., narrowed from the base to the acuminate tip, flat, rigid, upper very narrow; midrib slender; nerves very many and close, margins scabrid; sheath hairy; ligule 0. Pasiole dull blue-purple; rachis strict and branches scaberulous; branches alternate or fascicled, lower 4-6 in. branching at the base. Spikelets glabrous, sessile or pedicelled, longer or shorter than their slender pedicels; gls. rather coriaceous, nerves strong.—A very distinct-looking plant, unlike any known to me, but I have seen only one specimen, and it may prove to be a form of A. leptocklos.

21. A. gigantes, Dalz. in Dalz. & Gibs. Bomb. Fl. 293; tall, stout, upper leaves 1-1½ in. broad lanceolate base rounded or subcordate, panicle subcorymbosely thyrsiform, rachis stout, branches 2-4 in. densely crowded slender simple erect angular, spikelets ½ in. 2-3 seriate secund very shortly pedicelled, gl. I = ‡ II broadly ovate acute 3-nerved, II ovate acuminate

5-nerved, III rather longer than I, obtuse 5-nerved, IV lanceolate base naked, awn 0.

The CONCAN, Stocks; Kineshwur, at the foot of the Ghats, Dals. & Gibs.

Stem 6 ft., branched below, as thick as a goose-quill at 18 in. below the panicle, nodes swollen. Leaves 12-24 in., finely acuminate, subcoriaceous, many-nerved, scabrid above, glabrous or sparingly hairy, margins smooth; sheath sparingly hairy; ligule a narrow glabrous membrane. Panicle 5-7 in. long by 2-3 broad, brush-like, branches uniform, quite concealing the angular scabrid rachis. Spikelets brownish, short and broad, keel of gl. I scabrid.—A distinct-looking plant, nearest perhaps to A. Clarkes in inforescence.

22. A. blephariphylla, Trim. mss.; tall, stout, leafy, leaves long broad thin smooth, margins setosely serrulate, panicle broadly oblong, branches laxly whorled spreading filiform, spikelets & in. subsolitary as long as their pedicels glabrous, gl. I = & II broadly ovate acute 3-nerved, II ovate acuminate 5-nerved, IV oblong subacute 5-nerved, IV lanceolate scaberulous base naked, awn 0.—Panicum blephariphyllum, Trim. in Lond. Journ. Bot. xxii. (1885) 272, Cat. Ceyl. Pl. 105.

CEYLON; margins of woods by the sea at Resanwelle, Ferguson, Trimen.

Annual? Stem 3 ft. and upwards, nodes glabrous. Leaves 12-18 by nearly 1 in., rather membranous; sheath loose; ligule obscure. Pamicle 4-6 in.; rachis strict, nearly smooth; branches spreading or subrecurved; axils hairy.—The specimens are few, but the species appears to be a distinct one, nearest to A. leptochloc, which has narrower more coriaceous leaves and smaller spikelets.

23. A. Thwaitesii, Hook. f.; very slender, glabrous, leaves very narrow, panicle oblong effuse, branches capillary solitary alternate or the lower fascicled, branchlets spreading, spikelets \(\frac{1}{2}\) in. solitary shorter than their capillary pedicels, gl. I = \(\frac{2}{3}\) III very broadly ovate acute 3-5-nerved, IV lanceolate acute, awn 0. A. nervosa, var. Thwaites mss.

CEYLON, Walker?; Ambagamowa district, Thwaites (C.P. 3782).

Stem 2-3 ft., strict, erect; nodes glabrous. Leaves 4-8 by \(\frac{1}{2}\) \(\frac{1}{2}\) in., finely acuminate; ligule a short ciliate membrane. Panicle 3-5 in., branches naked at the base. Spikelets more turgid and coriaceous than usual in the genus, with shorter, broader, shorter pointed, purplish glumes; IV naked at the base.—Nearly allied to A. larglora, but has much broader glumes, of which III is longer than I and about as long as II.

UNDETERMINABLE SPECIES.

A. INDICA, Trin. mss. en Steud. Nom. Ed. II i. 143 = Agrostis biseta, Herb.

Spreng.-Name only.

A. SPICATA, Dalz. in Dals. & Gibs. Bomb. Fl. 293; stem 1 ft., leaves 1-11 by 1 in; ensiform and sheaths hispid, spike 11 in. cylindric (as in Setario) dense-fid. gl. I 1 in. lanceolate subulate subpliese 3-nerved, upper 1 in. long-attenuated and folded concealing the awn.—The Concan, on the Mahablashwur Hills, common.

A. JAPONICA, Duthie Grass. N.W. India, 18.

13. SETARIA, Beauv.

Spikelets 1- rarely 2-fid., not awned, clustered on the very short branches of a spike-like or narrowly pyramidal panicle, articulate on very short pedicels which bear a persistent involucel of few or many scabrid or barbed bristles (barren branchlets). Glumes 4, membranous; I = about

1 III; II = or shorter than IV; III neuter, rarely paleate and male, 5-7-nerved; IV coriaceous, plano-convex, bisexual, triandrous. Styles distinct. Grain free within the hardened gl. and palea.—Species about 10, temperate and tropical.

Distinguished from *Panicum* by the involuce, but connected with it by *P. plicatum* and *S. Forbesiana*; and from *Ponnisetum* by the persistent involucels and articulate deciduous spikelets. The species are for the most part difficult of limitation, and much of the synonymy requires revision.

1. S. italica. Beauv. Agrost. 51: leaves broad, panicle dense inclined or nodding simple and cylindric or lobed or compound, bristles few smooth or with minute spreading barbs, gl. I oblong or subglobose nearly smooth. Kunth Revis. Gram. 146, Enum. Pl. i. 153, Suppl. 108; Reichb. Ic. Fl. Germ. t. 47; T. Nees Gen. Fl. Germ. Monocot. i. n. 22; Wall. Cat. n. 8643; Trim. Cat. Cevl. Pl. 107; Aitchis. Cat. Panjab. Pl. 162; Duthie Grass. N.W. Ind. 8, Field & Gard. Crops, 5, t. 25, Fold. Grass. N. Ind. 15; Mig. Fl. Ind. Bat. iii. 467; Griseb. Fl. Brit. W. Ind. 554. S. asiatica, Hort, ex Reichb, Fl. Germ. Excurs. 29. S. compacta, Schur. Enum. Pl. Transylv. 967, Index. S. erythrosperma, flavida, persica & violacea, Hornen. ex Reichb. l. c. S. germanica, Beauv. Agrost. 51, t. 13. S. globularis, Presl. Rel. Haenk. 407; Mig. l. c. S. macrocheeta, Sch. Mant. ii. 274. S. maritima, R. & S. Syst. ii. 492. S. melinis, Link. ex Steud. Nom. Ed. II. ii. 574. S. panis, Jessen Deutschl. Graes. 248. Panicum egyptiacum & sibiricum. Hort. ex Roem. & Sch. Syst. ii. 493. P. asiaticum, mel-frugum, & serotinum, Hort. ex Schult. Mant. ii. 598, 599. P. attenuatum, setaceum & setosum, Hort. ex Trin. Gram. Panic. 166. P. brevisetum, Doell Fl. Grossk. Bad. 233. P. compactum, Kit. in Schult. Ester. Fl. Ed. II. i. 212. P. elongatum, Salisb. Prodr. 18. P. germanicum & indicum, Mill. Gard. Dict. Ed. 8, n. 1 & 3. P. globulare, Steud. Nom. l. c. 51; Syn. Gram. l. c. P. glomeratum, Moench. Meth. 207. P. intermedium & erythrospermum, Vahl ex Hornem. Hort. Hafn. i. 82. P. italicum, Linn. Sp. Pl. 56, Host l. c. t. 314; Trin. Sp. Gram. Ic. t. 188, 189; Roxb. Fl. Ind. i. 302; Steud. Syn. Gram. 51; Dalz. & Gibs. Bomb. Fl. Suppl. 98; Wight Cat. n. 1645. P. miliaceum, Blanco Fl. Filip. Ed. I. 39. P. maritimum, Hort. ex Lamk. Encycl. iv. 737. P. pumilum, Link Enum. Hort. Berol. 76. P. vulgare, Wallr. in Linnæa, xiv. (1840) 542. Pennisetum macrochaetum, Jacq. Eclog. Gram. iii. 36, t. 25; Kunth Enum. i. 152.—Setaria, Wall. Cat. n. 8651.—Rheede Hort. Mal. xii. t. 79.

HAB. Cult. throughout India, and up to 6000 ft. in the Himalaya.—DISTRIB. Most warm, temperate and tropical countries.

Stem 2-5 ft., usually branched, tufted, rooting towards the base, often robust. Annual. Leaves often long broad, margins retrorsely hispid, sheath smooth, mouth bearded. Spiciform panicle 3-5 in. long, very variable in diameter, number and length of bristles of involucel, and size and form of gl. IV.—Possibly a cultivated form of S. viridis, but nothing is known of its origin, which reaches back to the period of the Swiss Lake-dwellings. It has from time immemorial been cultivated in Asia, and one form is regarded by the natives as indigenous in Japan and China (see Du Candolle l'Origine des Plantes Cultivées, p. 303). Duthie and Stewart regard some small forms as indigenous in India, but they are more probably escapes or their progeny.

2. S. glauca, Beauv. Agrost. 51; panicle spiciform cylindric, involucels of 6-12 bristles with spreading or erect barbs, gl. IV transversely rugose. Kunth Enum. Pl. i. 149, Suppl. 106; Wall. Cat. n. 8639; Griff. Notul. 44, Ic. Pl. Asiat. t. 149, f. 1; Dalz. & Gibs. Bomb. Fl. 293; Aitchis.

Cat. Panjab. Pl. 162; Trim. Cat. Coyl. Pl. 105; Mig. Fl. Ind. Bat. iii. 466: Duthie Grass. N.W. Ind. 8, Indig. Fodd. Grass. t. x., Fodd. Grass. N. Ind. 14; Griseb. Fl. Brit. W. Ind. 554; Benth. Fl. Austral. vii 492; Reichb. Ic. Fl. Germ. t. 47; Boise. Fl. Orient. v. 442; Baker Fl. Maurit. 442. S. aurea, Hochst. ex A. Br. in Flora, xxiv. (1841) 276. S. auricoma, Link. ex Loud. Hort. Britt. 25. S. chrysantha, Heynh. Nom. ii. 661. S. flava. Kunth Rev. Gram. i. 46. S. helvola, Roem. & Sch. l. c.; Mig. l.c. 467. S. humifusa & rubicunda, Dum. Obs. Gram. Belg. 139. S. pumila, Sch. Mant. ii. 274. P.S. sciuroidea, C. Muell. in Bot. Zeit. xix. (1861) 316. S. tejucensis, Kunth Enum. Pl. i. 150. S. Ventenatii, Kunth Rev. Gram. i. 251, t. 37. S. dasyura, Hort. Hal. ex Schlecht in Linnea, xxvi. (1853) 463. S. penicillata, Nees in Wall. Cat. n. 8640 A. B. C. E. Panicum alopecuroides, Koen. ex Trin. Gram. Panic. 162. P. chrysanthum, Steud. Nom. Ed. 2. ii. 254. P. flavescens, Moench. Meth. 206. P. glaucum, Linn. Sp. Pl. 56; Host Gram. Austr. ii. t. 16; Trin. Sp. Gram. Ic. t. 195; Roxb. Fl. Ind. 1. 285; Thw. Enum. 361; Wight Cat. n. 1643; Benth. Fl. Hongk. 411; Nees Fl. Afr. Austr. 55, Agrost. Bras. 241. P. helvolum, Linn. f. Suppl. 107. P. holcoides, Jacq. Eclog. Gram. t. 22. P. lævigatum, Ell. Sketch. i. 112. P. lutescens, Weig. Obs. 20. P. luteum, Guldenst. Reis. ii. 58. P. minimum, Wall. Cat. 8641 B. P. penicillatum, Willd. ex Nees Agrost. Bras. 242; Willd. & (or P. helvolum, Linn.) Wight Cat. n. 1644. P. polystachyum, Herb. Heyne ex Wall. Cat. 8639 E. P. pumilum, Poir. Encycl. iv. 273 (ex Kunth l. c.). P. Ventenatii, Steud. Nom. Ed. II, ii. 265. P. verticillatum, Rottl. ex Spreng. Syst. i. 304. P. viride, Poll. Hist. Pl. Palat. i. 55. Pennisetum glaucum & helvolum, Br. Prodr. 195.

Throughout INDIA, especially in cult. ground.—DISTRIB. All warm, temp. and trop. regions.

Annual. Stem 1-2 ft. erect or ascending, simple or branched. Leaves broad or narrow, sometimes 18 by \(\frac{1}{2} \) in., flat, glabrous or sparsely hairy, margins scabrid. Spiciform panioles cylindric, 1-7 in., dense-fld., usually yellow, rarely purplish or green, rarely interrupted; sometimes reduced to an ovoid head with very few spikelets; bristles of involucel 6-12, very variable in length, from a little longer to four times as long as the ovoid spikelet; gl. I minute; II rather shorter than III, subscute; III usually empty, sometimes paleate and male; IV broadly ovoid, very convex.

Var. macrocarpa; gl. III and IV equal and subsimilar in the ripe state, forming a subglobose crustaceous rugose sphere & in. diam., III paleate empty, IV fem., bristles of involucel & in. pale rufous.—The Panjab, Aitchison, Western Bengal and Behar, Kurz.—A remarkable form, but passing into the ordinary state of the plant by intermediates.

Var. parviflora, Munro mss.; stems 6-10 in. branched and decumbent below, leaves smaller, spiciform panicle \(\frac{1}{2}\)-1 in., ovoid nearly white, bristles of involucel \(\frac{1}{2}\)-1 in., gl. IV much less strongly rugose.—? S. imberbis, Roem. & Soh. ii. 891; Wall. Cat. n. 8641 A in part, B-F. Panicum Codaea, Herb. Ham. in Wall. Cat. l.c.—Kumaon, alt. 4-5000 ft., Duthie. Khasia Hills, alt. 5000 ft., Clarke. The Concan, Madras and Burma, Wallich.—Probably the S. imberbis, of Africa, &c., but a smaller plant, with very small spikes, differing in this respect and in the less rugose gl. IV from S. glauco.

3. S. intermedia, Roem. & Sch. Syst. ii. 489; panicle narrowly pyramidal subspiciform or very slender with segregate clusters of involucels, bristles of involucel with spreading or suberect barbs, gl. IV small oblong subruguiose. Kunth Enum. Pl. i. 150; Aitch. Cat. Panjab. Pl. 162; Trim. Cat. Ceyl. Pl. 105; Duthie Grass. N.W. Ind. 9, Fodd. Grass. N. Ind. 14; Miq. Fl. Ind. Bat. iii. 466. S. verticillata, Wall. Cat. n. 8642 (D. in

part) G. S. glauca, Hochst. Pl. Hohenack. n. 937. Panicum intermedium, Roth Nov. Sp. 47; Thw. Enum. 361.

Plains and lower hills of India, but not common. Himalaya, the Panjab, to Bengal, Central India, and the Nilghiei Hills. Centon, in shady places, Thwaites.—Distrib. Temp. and trop. regions.

Undistinguishable from S. verticillata except by the barbs of the bristles of the

involucel not being reversed. It is probably a common but overlooked grass.

4. S. verticillata, Beauv. Agrost. 51; panicle subpyramidal or subspiciform, lower involucels in segregate clusters, bristles with reversed barbs, gl. IV minutely rugulose. Kunth Enum. Pl. i. 152; Wäll. Cal. n. 8642 A. B. C. D in part, E. F.; Dulz. & Gibs. Bomb. Fl. 294; Aitch. Cat. Panjab Pl. 162; Trim. Cat. Ceyl. Pl. 105; Duthie Grass. N.W. Ind. 9, Fodd. Grass. N. Ind. 15; Benth. Fl. Austral. vii. 494; Host Gram. Austr. t. 13; Reichb. Ic. Fl. Germ. t. 47; T. Nees Gen. Fl. Germ. Monoc. n. 22. S. floribunda, Spreng. Syst. i. 305; Wall. Cat. n. 8642 E. S. nubica, Link. Hort. Berol. i. 220. S. respiciens, Hochst. ex Mig. Fl. Ind. Bat. iii. 467. S. verticilliformis, Dum. Fl. Belg. 150. S. Rottleri, Spreng. Syst. Veg. i. 304; Steud Syn. Gram. 153. P.S. tomentosa, Kunth Revis. Gram. i. 47; Enum. Pl. i. 157. Panicum Aparine, Steud. 52. P. adhaerens, Forsk. Fl. Egypt. Arab. 20. P. asperum, Lamk. Fl. Fr. iii. 577. P. floribundum, Willd. ex Spreng. Syst. i. 306. P. humile, Trin. Gram. Panic. 167. P. italicum, Ucria, Hort. Reg. Panorm. 54. P. respiciens, Hochst. ex Steud. l. c. 52. P. rude, Lamk. ex Steud. Nom. Ed. 1, 589, 772. P.P. tomentosum, Roxb. Fl. Ind. i. 301. P. verticillatum, Linn. Sp. Pl. Ed. II, 82; Roxb. Fl. Ind. i. 301; Thw. Enum. 361; Trin. Sp. Gram. Ic. t. 202. P. viride, Desf. Fl. Atlant. i. 58. Pennisetum verticillatum, Br. Prodr. 195. Penn. respicions, A. Rich. Tent. Fl. Abyss. ii. 379.

Throughout INDIA, in shady places, ascending the Himalaya to 6000 ft. CEYLON,

not very common. - DISTRIB. Temp. and trop. regions.

Annual. Habit of S. glauca but usually more flaccid. Leaves sometimes 1 inbroad, scaberulous. Panicle 2-7 in. long, erect or curved, green; bristles of involuced one or few, about $\frac{1}{6}$ in. long, flexuous. Spikelets $\frac{1}{16}$ -12 in.; gl. I about $=\frac{1}{3}$ III; II about = IV which is nearly smooth and shining.

5. S. viridis, Beauv.—Agrost. 51; panicle spiciform cylindric often • interrupted, bristles of involucel 3-6 with erect or spreading barbs, gl. IV oblong minutely punctulate or subrugulose. Kunth Erum. i. 151; Aitch. Cat. Panjab. Pl. 162; Miq. Fl. Ind. Bat. iii. 467; Host Gram. Austr. ii. t. 14; Fl. Dan. t. 352; Reichb. Ic. Fl. Germ. t. 47; Boiss. Fl. Orient. v. 443; Benth. Fl. Austral. vii. 494; Griseb. Fl. Brit. W. Ind. 554; Duthie Grass. N.W. Ind. 9. S. affinis, Schult. Mant. ii. 275. S. ambigua, Guss. Fl. Sic. Syn. i. 114. S. chlorautha, Schur Enum. Pl Transs. 723. S. decipiens, C. Schimp, ex Nym. Consp. 787. S. imberbis & Weinmanni, Room. & Schult. Syst. ii. 891, 490. S. nana, Dum. Obs. Gram. Belg. 139. S. penicillata, Wall. Cat. n. 8640 D. S. villosa, Beauv. Agrost. 51. Panicum bicolor, Moench. Meth. 206. P. cynosuroides, Scop. Fl. Carn. Ed. II. i. 50. P. humile, Thunb. ex Trin. Gram. Panic. 164. R. imberbe, Poir. Encycl. Suppl. iv. 272. P. lævigatum, Lam. Fl. Fr. iii. 578. P. psilocaulum, Steud. Syn. Gram. 50. P. purpurascens, Opiz. in Flora, v. 266; Raddi ex Nees Agrost. Bras. 240. P. quale Linnæi, Krock Fl. Siles. i. 88. P. reclinatum, Vill. Hist. Pl. Dauph. ii. 64. P. tejucense, Nees ex Trin. Gram. Panic. 166. P. virescens, Salzm. ex Doell in Mart. Fl. Bras. ii. II, 157. P. viride, Linn.

Syst. Ed. x. 870; Trin. Sp. Gram. Ic. t. 203. Pennisetum viride. Br. Prodr. 195.

TEMPERATE HIMALAYA and WESTERN TIBET, ascending to 11,000 ft., but not common: rare on the plains of Iudia. NILGHIEI HILLS? (perhaps introduced) Heyne (in Herb. Wallich. n. 8640 D.) .- DISTRIB. Temp. and subtrop. regions of the Old World.

Annual. Habit of S. glauca, but spike-like panicle more interrupted; bristles of involucel 3-6, usually short, green or reddish; spikelets larger and more ovoid, and gl. IV nearly smooth. Gl. $I = about \frac{1}{2}$ III, acute; II and III subequal, 5-7nerved.

6. S. gracillima, Hook. f.; leaves long narrow pubescent, peduncles elongate filiform scaberulous, spike-like panicle elongate rachis capillary villous or pubescent, spikelets minute solitary or in distant shortly pedicelled clusters of 2-3, bristles 1-2 capillary most minutely scaberulous, gl. IV transversely rugulose.

CEYLON, Gardner (n. 968).

Whole plant 18 in. high, flaccid, very slender; stems densely tufted. Leaves 8-12 by 1 in., finely acuminate, pubescent on both surfaces, base narrow; sheath narrow, mouth villous. Peduncles 3-4 in., quite erect, rachis hardly flexuous, pedicels pubescent, bristles erect, often solitary. Spikelets subglobose, glabrous, green; gl. I = 1 III, broadly ovate, 3-nerved; II shorter than IV, 5-7-nerved; III as long as IV. subscute. 5-nerved, pales large hyaline: IV pale, coriaceous, acute.—Quite unlike any other species.

7. S. Forbesiana, Hook. f.; perennial, tall, erect, leaves linearlanceolate base rounded, panicle narrowly pyramidal, branches short or elongate, bristles few very rigid, spikelets ovoid, glumes strongly nerved, IV minutely transversely rugulose. Setaria macrostachya, Duthie Grass. N.W. Ind. 9; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1890) 2; Herb. Ind. Or. Hook. f. & Thoms. (vix H. B. & K.). Panicum Forbesianum, Nees ex Steud. Syn. Gram. 98; Anderes. in Walp. Ann. vi. 948.—Punicum, Wall. Cat. n. 8704.

TEMPERATE HIMALAYA; from Nepal, Wallioh, to Mishmi, Griffith, ascending to 5000 ft. Khasia Hills, alt. 2-4000 ft. The Concan, Lisboa.

Stems 3-5 ft., tufted, as thick as a duck's quill, quite smooth. Leaves 12-18 by 1-2 in., finely acuminate, flat, nearly smooth except the margins; sheath glabrous or margins and mouth villous; ligule of long silky hairs. Panicle 5-12 in., strict, rachis stout, either narrowly pyramidal with erecto-patent lower branches 1-11 in. long, or spiciform with short branches. Involuced of few green or purple stout bristles, in long or less. Spikelets 10-1 in., sessile, ovoid, green; gl. I = 1 III, acute or obtuse, 3-nerved; II shorter than IV, orbicular, subacute or obtuse, 9nerved; III = IV, 7-9-nerved, paleate, male or neuter; IV oblong-ovoid, subscute turgid, white.-Very near Setaria macrostachya, H. B. & K. of tropical America and Australia, which differs more in habit than any other characters, having a much denser panicle and the leaves very much narrowed at the base. Both are closely allied to Panicum plicatum, but the leaves are not plicate.

UNDETERMINABLE, &C., SPECIES.

- S. ? CANESCENS, Kunth Rev. Gram. i. 47, Enum. i. 157 = Panicum canescens. Roth Nov. Sp. 54; Steud. Syn. Gram. 54.
 - S. FIELDINGH, C. Muell. in Bot. Zeit. xix. (1861) 323. Not an Indian grass.
- S. HIETA, Kunth Rev. Gram. & Enum. U. c.c. = Panicum hirtum, Roth l. c. 46. P. Rothii, Spreng. Syst. i. 310. Oplismenus? hirtus, Roem. & Sch. Syst. ii. 485. Echinochloa? hirta. Schult. Mant. ii. 270.

S. LUXURIANS, Willd. Herb. ex Spreng. Syst. i. 305; Kunth Enum. i. 156 - Panicum Willdenowii, Steud. nom. Ed. II. ii. 265, Syn. Gram. 54.

S. ASPERA, Miq. Fl. Ind. Bat. iii. 469.

14. PRINCISETUM, Pers.

Annual or perennial grasses. Infl. of involucellate spikelets articulate (in Indian species) on the rachis of a simple spike; involucels of unequal scabrid or plumose filiform simple or branched bristles. Spikelets 1-3 in each involucel, sessile or very shortly pedicelled, inarticulate at the base and persistent, 1-2-fid., ovoid, glabrous or sparsely hairy. Glumes 3-4, I-III hyaline; I smallest or 0, II and III 5-nerved, subequal or II shortest, rarely absent; III paleate or not, male or neuter; IV coriaceous, bisexual or fem., articulate at the base and deciduous. Stamens 3, anthers long. Styles long, free or connate below. Grain free within the gl., oblong, orbicular or pyriform.—Species probably 30-40 of all warm countries.

The synonomy of the species is almost inextricable, and as here given for the Indian species is open to correction in some cases. Dr. Stapf has kindly revised them with me.

Sect. I. Penicillabia. Anther-cells with bearded tips. Styles connate.

P. TYPHOIDEUM, Rich. in Pers. Syn. i. 72; Del. Fl. Ægypt. 17, t. 8, f. 3; Trin. Diss. ii. 71 (typhoides); Boiss. Fl. Orient. v. 447; Trim. Cat. Ceyl. Pl. 106; Duthie Grass. N.W. Ind. 11, Field & Gard. Crops, 30, t. 71, Fodd. Grass. N. Ind. 18; Lisboa, in Journ. Bomb. Nat. Hist. Soc. v. (1891) 339. P. alopecuroides, Spreng. Syst. i. 303 (in part). P. cereale, Trin. in Mem. Acad. Petersb. Ser. vi. iii. II (1835) 185. P. cylindricum, Sw. ex Trin. Diss. ii. 70. P. giganteum, Tenore ex Steud. Nom. Ed. II. ii. 297. P. Linnaei, Kunth Revis. Gram. i. 49. P. megastachyum, Steud. Syn. Gram. 108. P. spicatum, Roem. & Sch. Syst. ii. 499. P. violacenm, Rich, in Pers. Syn. i. 72. Penicillaria alopecuroides, Sweet Hort. Brit. Ed. I. 440; A. Braun Ind. Sem. Hort. Berol. (1855), App. 25. Penic. ciliata, Willd. Enum. Hort. Berol. 1037. Penic. chinensis, Nees ex A. Br. l. c. 26. Penic. cylindrica, Roem. & Sch. l. c. 498 (non Nees). Penic. fallax, Fig. & Not. in Mem. Acad. Tor. II, xii. (1852) 371. Penic. involucrata, Schult. Mant. ii. 283; Schlecht. in Linnea, xxv. (1852), 565. Penic. nigritarum & Sieberiana, Schlecht. l. c. 561, 565. Penic. Plukeneti, Link Enum? Hort. Berol. i. 221; Nees Fl. Afr. Austr. 72. Penic. Roxburghii, A. Br. & Bouché Ind. Sem. Hort. Berol. l. c. 26. Penic. typhoidea & Raddiana, Fig. & Not. l. c. 371, 373. Penic. solitaria, Stokes Bot Mat. Med. i. 129. Penic. spicata, Willd. l. c.; Beauv. Agrost. 58, t. 13, f. 4; Wall. Cat. n. 8644; Anderes. in Walp. Ann. vi. 966; Kunth Enum. Pl. i. 165, Suppl. 120, t. 11, f. 1; Jacq. Eclog. Gram. t. 17; Aitchis. Cat. Panjab. Pl. 163. Panicum spicatum, Rowb. Fl. Ind. i. 283. Pan. americanum, Linn. Sp. Pl. 56. Cenchros alopecuroides, Thunb. Prodr. Fl. Cap. 24. C paniceus, Heyne ex Wall. Cat. n. 8650. C. spicatus, Cav. Descr. 304, 614. Holcus paniciformis, Roch. Ic. ined. n. 896. H. racemosus, Forek. Fl. Æg. Arab. 175. H. spicatus. Linn. Syst. Ed. z. 1305; Grah. Cat. Bomb. Pl. 238; Dalz. & Gibs. Bomb. Fl. Suppl. 99. Alopecurus indicus, Linn. Syst. Ed. Murray 92 (excl. Syn. Pluk.). A typhoides, Burm. f. Fl. Ind. 27.—Penicillaria, Wall. Cat. n. 8644, 8650.

Throughout the hotter parts of INDIA, cultivated or an escape; also all Africa and S. Europe.

Annual. Stem 3-6 ft., erect, simple, or branched from the root, slender or stout, sometimes as thick as the middle finger at the base, solid, leafy, upper nodes glabrous or woolly, lower rooting. Leaves 1-3 ft. by 1-2 in., lanceolate, spreading and drooping, flat, more or less hairy; midrib stout or slender; sheath rather inflated; ligule of hairs. Peduncle more or less woolly below the spike. Spike 6-12 in. by 1-14 in. diam., erect, cylindric, dense-fid.; rachis hairy or woolly, branchlets 1-8-fid., concealed by the densely packed spikelets; bristles of involucel more or less unilateral, as long as the spikelets or longer, scabrid and ciliate, white or colrd. Spikelets 1-1 in., usually solitary in the involucel, oblong ovate or ovatelanceolate, pedicelled, pedicel ciliate; gl. I minute or 0, 4-orbicular or subquadrate, 1-3 nerved; II very variable in length, sometimes absent, usually 1-1 IV, subquadrate, truncate, obtuse or retuse 3-nerved, very rarely as long as IV and coriaceous; III ovate-oblong, obtuse or truncate and apiculate, 5-nerved, epaleate or paleate, and male or neuter, rarely bisexual; IV coriaceous or herbaceous, ovate, scute. 5-7-nerved; palea very broad, truncate, ciliate at the tip and dorsally, nerves 2 approximate excurrent. Lodicules 0. Anthers linear. Grain oblong, obovoid, or pyriform, smooth, free, and top exposed.—Only known in cultivation or as an escape, and it is difficult to say whether the many known forms originated in one or more species. Alph. De Candolle unfortunately does not include it in his "Origine des Plantes Cultivées." Its abundance throughout Africa would point to that continent as its source. There are very great differences in the number, sizes, and shapes of the glumes, of I and II especially, which are not unfrequently both absent. The materials are not sufficient to enable me to attempt a classification of the numerous forms cultivated or growing as escapes in India. To do this would require an exhaustive examination of the African forms, of which there are legions. I can only refer to Schlechtendahl's paper in the Linnea, xxv. (1852) 530, to Kornicke & Werner's Handb. der Getreidebaues (i. 291), and to Braun's descriptions of 22 cultivated forms, chiefly African, in Walp. Ann. vi. 961. Roxburgh alludes to five varieties as cultivated in India, but does not distinguish them. The following five are selected as noteworthy.

1. Tall, very stout, leaves broad, spike very stout (Typha-like), 8-12 by 1-11 in. diam., involucels on long ciliate pedicels with sometimes a superposed one, bristles much longer than the spikelets, dark brown; spikelets clustered in the involucels or chiefly in the upper involucel if present, ovoid or oblong, gl. I minute semilunar or 0, II 0 or like I or larger and quadrate truncate 3-lobed 3-nerved, III = IV 5-nerved. paleate, palea very broad quadrate entire or 2-fid. 2-nerved dorsally villous, IV 7-nerved emarginate apiculate, palea as in III.—The largest cult. form. Wall. Cat. n. 8644.

2. Spike cylindric 7 by 4 in., involucels shortly pedicelled, bristles shorter than the spikelet pale, spikelets 1-3 10 in., gl. I and II minute semilunar, III broadly oblong paleate and 3-nerved, palea dorsally villous, IV 7-nerved nerves and margins ciliate,

palea as in III .- N.W. India, Royle.

3. Tall, erect, spike 4-5 in., stem densely villous towards the top, involucels shortly pedicelled, bristles longer than the spikelets pale or purplish, spikelets subsolitary $\frac{1}{6}$ in. elliptic-lanceolate, gls. 3, I 0, II = $\frac{1}{1}$ $\frac{3}{6}$ IV oblong truncate 5-nerved paleate, III ovate cuspidate 5-nerved.—A very common cult. form. Lahore, Stewart. - Alopecurus indicus, Hb. Heyne.

4. Stem slender 12-18 in., leaves very narrow, spike 1 in, rather slender, involucels shortly pedicelled, bristles longer than the spikelet, pale, spikelets subsolitary ovate, gls. 3, I minute semilunar, II = 1 III subquadrate 3-nerved. III ovate tip truncate and mucronate strongly 5-nerved, nerves and tip ciliate .-

5. Spike 4-7 in., involucels shortly pedicelled, bristles much longer than the spikelets very pale, spikelets 1 1 in. narrowly lanceolate, glumes 8 all membranous, I minute, II = } III oblong truncate 8-nerved, III elliptic-lanceolate strongly 3-nerved tip emarginate mucronate, palea parrow oblong-lanceolate smooth, anther cells most minutely bearded, ovary produced into a flexuous compressed twisted awn an inch long. Penicillaria cylindrica, R. & S.; Wight Cat. n. 1662.—A diseased form.

- Sect. II. PENNISETUM proper. Anther-cells not bearded.
- * Bristles of involucel all free to the base, slender.
- + Bristles branched.
- 1. P. lanatum, Klotzsch in Bot. Erg. Waldem. Reise, 65, t. 93. P. sericeum, Munro mes. P. nepalense, Griseb. in Goett. Nachr. (1868) 302 (non Spreng.)

WESTERN HIMALAYA, alt. 7-9000 ft.; from Kashmir to Garwhal, and WESTERN

TIBET, Jacquemont, &c.

- Perennial; rootstock often stout, woody, creeping and branching; stem 1-3 ft. Leaves 6-18 by \(\frac{1}{2}\)-\frac{1}{2}\) in, flat, glabrous hairy or silkily villous. Spikes 2-5 in., \(\frac{1}{2}\)-\frac{1}{2}\] in. diam., pale green; peduncle and rachis more or less villous; involucels pedicelled, densely imbricate. Spikelets \(\frac{1}{2}\) in., solitary in the involucels, rather shorter than the scabrid and sparsely ciliate branching bristles; gl. I = \(\frac{1}{2}\) III, ovate, acute; II = \(\frac{1}{2}\) IV, oblong, obtuse, 3-nerved, III and IV lanceolate, acuminate, 5-nerved.
 - †† Bristles unbranched, scaberulous, not or sparingly ciliate.
- 2. P. Alopecuros, Steud. Syn. Gram. 102 (non Jacq.); peduncle and rachis of spike glabrous, spikelets \(\frac{1}{2} \) in. solitary narrowly lanceolate, gl. I minute, II = \(\frac{1}{2} \) III oblong obtuse 1-3-nerved, III lanceolate acuminate 7-11-nerved, IV subulate-lanceolate 5-nerved. Duthic Grass. N.W. Ind. 10; Lisboa in. Journ. Bomb. Nat. Hist. Soc. v. (1890) 338. P. Hohenackeri, Hochst. ex Steud. l. c. 103. P. aureum, Dalz. & Gibs. Bomb. Fl. 294; P. Link. Hort. Berol. i. 215. Gymnothrix Alopecuros, Nees in Wight Cat. n. 1663; Steud. l. c. G. cenchroides, Roem. & Sch. Syst. ii. 499; Kunth Enum. Pl. i. 155; Wight ex Steud Syn. Gram. 102. Cenchrus hordeiformis, Herb. Rottl. ex Steud. l. c. 102 (non Thunb.). Panicum helvolum, Herb. Madr. ex Wall. Cat. n. 8652 A. Pan. hordeiforme, Thunb. Fl. Japon. 48 (partly). —Gymnothrix P. Wall. Cat. n. 8652.

RAJPUTANA; swamps on Mt. Abu, Duthie. The Concan, Stocks, &c. NILGHIRI HILLS, alt. 5500 ft.

Perennial. Stems 2-3 ft., stout, erect, densely tufted below, subdistichously branching upwards; branches strict, erect. Leaves 12-18 by $\frac{1}{10} - \frac{1}{6}$ in., coriaceous, convolute, glabrous, base and flattened distichous sheath often villous; ligule of hairs. Spikes 5-7 in., usually pale green; rachis flexuous; involucels very shortly pedicelled; bristles few, very unequal, nearly straight, longest 2-3 times as long as the spikelet, bases quite free; gl. I suborbicular.—Habit of P. compressum. The P. aureum of the Bombay Flora is, I do not doubt, P. Alopecuros, but what P. aureum of Link may be is uncertain.

3. **P. flaccidum**, Griseb. in Goett. Nachr. (1868) 86; peduncle and rachis of spike glabrous, spikelets & in. solitary ovate-lanceolate, gl. I very small orbicular or 0, II = \frac{2}{3} IV lanceolate 5-nerved, III and IV ovate-lanceolate subsetaceously acuminate 5-nerved. Duthie Grass. N.W. Ind. 10. P. mongolicum, Franch. mss. Gymnothrix flaccida, Munro ex Aitchis. Cat. Panjab. Pl. 163.

Temperate and alpine HIMALAYA, alt. 5-11,000 ft.; from Kashmir to W. Nepal and Western Tiber.—Distrib. Affghan., Central Asia.

Perennial. Stem 6-24 in., den-ely tusted, creeping below, branching at the base only, slender above. Leaves 5-10 by \(\frac{1}{4}\) in., flat, glubrous or sparsely hairy, base

contracted, mouth of the often ciliate sheath bearded. Spikes 2-6 in., rather slender, very pale, often flexuous; involucels subsessile; bristles nearly straight or flexuous, one often very much the longest, all free to the base.

4. P. compressum, Br. Prodr. 193; tip of peduncle and rachis of spike more or less villous, spikelets 1 in. solitary lanceolate, gl. I minute or 0, II = 1-1 III ovate-lanceolate acute or obtuse 1-nerved, III ovate acuminate 5-7-nerved epaleate, IV = III 5-nerved. Schrud. in Linnac, xii. (1838) 431; Benth. Fl. Austral. vii. 495; Steud. Syn. Gram. 102. P. alopecuroides, Spreng. Syst. i. 303 (in part). P. chinense, Steud. l.c. 108. P. cynosuroides, Wall. Cat. n. 8653. P. hordeiforme, Spring. Syst. i. 302. P. nigricans, Trin. ex Steud. Nom. Ed. II. ii. 297, Syn. Gram. 103. P. japonicum, Trin. in Spreng. Neue Entdeck. ii. 76, Diss. ii. 63, Pan. Gen. 88, Sp. Gram. Ic. t. 19; Franch, et Savat. Enum. Pl. Jap. ii. 164. Penicillaria chinensis, Nees ex Steud. l. c. Gymnothrix compresse, Brongn. Voy. Coq. Bot. 103. P.G. cenchroides, Roem, & Sch. i. 499 (in part). G. hordeiformis, Nees in Linnæa, vii. (1832) 276. G. japonica, Kunth Enum. Pl. i. 158. G. nigricans, Prest Rel. Haenk, i. 315. G. purpurascens, Sw. ex Trin. Diss. ii. 64. Pan. Gen. l. c. P Conchrus hordeiformis, Thunb. Prodr. Pl. Cap. 24. C. purpurascens, Thunb. in Trans. Linn. Soc. ii. (1794) 329. Setaria compressa, Kunth Revis. Gram. 46, Enum. i. 150. Panicum alopecuroides. Linn. Sp. Pl. 55. P. aristidoides, Willd. ex Spreng. Syst. i. 302. Pan. asperum, Link, Enum. Hort. Berol. i. 75 (non Sch. ?). Pan. hordeiforme, Thunb. Fl. Jap. 46, t. 9 (excl. cit. Afr.). P Alopecurus hordeiformis, Linn. Sp. Pl. 60.—Gymnothrix, Wall. Cat. n. 8653.

BURMA; Tuong Dong, Wallich; Shan Hills, alt. 4000 ft., Manders .- DISTRIB.

China, Japan, Tonkin, Australia.

Perennial; stem 1-2 ft., densely tufted. Leaves 12-18 in., very narrow, convolute, silkily villous towards the base; sheath glabrous or ciliate; liquid obscure. Spikes 2-4 in., purplish in Indian specimens; involucels pedicelled, pedicels villous; bristles few, very unequal, one or two much longer than the rest and an inch long, all free at the base.—Trinius refers to P. compressum, the Alopecurus hordeiformis, Linn. (Comohrus hordeiformis, Thunb., Gymnothris cenchroides, R. & S.), which appear to me to be more probably P. Alopecurus.

5. P. dichotomum, Delile Fl. Ægypt. 159, t. 8, f. 1; stem dichotomously branched rigid, peluncle and rachis glabrous, spikelets \(\frac{1}{2} \) in. usually solitary lanceolate, gl. I = \(\frac{2}{3} \) III ovate lanceolate acuminate, II = III lanceolate acuminate 5-7-nerved, III = IV both 5-nerved. Trim. Diss. ii. 66, Pan. Gen. 94; Kunth Enum. Pl. i. 161, Suppl. 110; Steud. Syn. Gram. 105; Boiss. Fl. Orient. v. 444; Aitchis. Cat. Panjab. Pl. 162; Duthie Grass. N.W. Ind. 10. P. phalarides, Schult. Mant. ii. 147; Ness Agrost. Bras. 283. Gymnothrix longiglumis, Munro in Cat. Griff. &c. Pl. 56 (name). Cenchrus ramosissimus, Poir. Encycl. vi. 51; Dals. & Gibs. Bomb. Fl. 294. Phalaris setacea, Forsk. Fl. Ægypt. Arab. 20. Panicum dichotomum, Forsk. l. c.; Steud. l. c. 105.

PAUJAB and the N.W. PROVINCES (fid. Duthis). PERHAWUR, Aitchison. SIND and GUZERAT; on sand hills, Stocks.—Distrib. Affghan. and westwards to N. Africa.

Perennial, quite glabrous, bushy. Stems distantly branched; internodes long, rigid, polished; branches sometimes fascicled. Leaves short, rigid, convolute. Spikes 3-5 iu., cylindric, pule, nearly white; rachis scabrid; bristles of sessile involuced very many, slender, flexuous, pale, the longer nearly twice as long as the spikelet, inner stouter somewhat plumose, all free at the base.—I have seen no specimens from the Paujab or the N.W. Provinces.

6. P. parviflorum, Trin. Diss. ii. 65, Sp. Gram. Ic. t. 288; annual, erect, peduncle and rachis glabrous, spike very narrow purple, spikelets in. solitary narrowly lanceolate, gl. I minute suborbicular, II longest truncate cuspidate 5-nerved, III = \frac{3}{2} II truncate toothed 5-nerved paleate male, IV = III lanceolate obtuse nerveless shining. Steud. Syn. Gram. 103. P. imberbe, Edgew. in Journ. Linn. Soc. xxi. (1852) 181 (name); Steud. Syn. Gram. 104; Duthie Grass. N.W. Ind. 10, Indig. Fodd. Grass. t. 50, Fodd. Grass. N. Ind. 18. Gymnothrix hordeoides, Kunth Revis. Gram. i. 48, Enum. i. 60. Panicum hordeoides, Poir. in Lam. Illust. i. 170. Alopecurus rubicundus, Herb. Ham. ex Wall. Cat. n. 8646 B.

RAJPUTANA; at Oodeypore, Wingate (Herb Duthie). BEHAR, on Parusnath,

and at Huzaribag's, Carke. - DISTRIB, tropical Africa.

Stem 2-3 ft., branching upwards, leafy, branches erect. Leaves 4-10 by \$-\frac{1}{2}\$ in., fat, base and mouth of sheath ciliate. Spikes 3-5 by \$\frac{1}{2}\$ in. diam.; rachis very slender, strict, as it were crenate from the projections between the close-set spike-lets; bristles of sessile involucel very slender, quite free, a few 4-6 times as long as the spikelet.—Closely allied to P. setosa. Probably not indigenous in India.

- †† Bristles unbranched, inner copiously ciliate or lanate.
- 7. P. orientale, Rich. in Pers. Syn. i. 72; perennial, rachis of spike hairy, spikelets 2-5 in each pedic-led involuced $\frac{1}{6}$ in lanceolate, gl. I = III ovate or oblong nerveless, II shorter than IV ovate-lanceolate acuminate 3-nerved, III longest aristately acuminate 5-nerved, IV oblong-lanceolate aristate shining. Trin. Diss. ii. 69; Kunth Enum. Pl. i. 162, ii. 117; Griseb. in Ledeb. Fl. Ross. iv. 472; Cass. & Dur. Fl. Alger. ii. 39; Boiss. Fl. Orient. v. 445; Duthie Grass. N.W. Ind. 10. P. araneosum, Edgew. in Journ. Beng. As. Soc. xxi. (1852), 180; Steud. Syn. Gram. 105; Aitchis. Cat. Panjab Pl. 162; Duthie Grass. N.W. Ind. 10. P. asperifolium, Kunth Revis. Gram. i. 49, Enum. Pl. l.c. P. elatum, Hochst. ex Steud. Nom. Ed. II. ii. 297. P. fasciculatum, Trin. in Mem. Acad. Petersb. Ser. 6. iii. 11. (1835) 181. P. Griffithii, Munro Cat. Pl. Griff. &c. ined. 56. P. macrostachyum, Fresen. in Mus. Senkenb. ii. 135 (non Trin.). P. persicum, Boiss. & Buhse in Nov. Mem. Soc. Nat. Mosc. xii. (1860) 232. P. phalariforme, Steud. Syn. Gram. 106 (ex descript.). P. Ruppellii, Steud. Nom. l.c. P. sinaicum, Decne in Ann. Sc. Nat. Ser. 2, ii. (1834) 11; Aitchis. l. c. Duthie l.c. P. tenue & variabile, Fig. & Notar. in Mem. Accad. Torin Ser. 2, xii. (1852), 248, 248. P. tiberiadis, Boiss. Diagn. Ser. I. xiii. 43. Cenchrus asperifolius, Desf. Fl. Atlant. ii. 388. C. hordeiformis, Pers. l. c. 71 (non Lamk). C. orientalis, Willd. ex Trin. Diss. ii. 69; Kunth l.c. 162. Panicum orientale, Willd. Enum. Hort. Berol. ii. 1031.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 3-6000 ft. The PANJAB, SINDH, the CONCAN and BEHAE (on Parusnath, alt. 2000 ft., Clarke).—DISTRIE. Westward to Asia Minor and N. Afr.

Stem 2-6 ft., erect or ascending from a densely tufted often stout creeping branching rootstock. Leaves 1-2 ft. by \$\frac{1}{2}\$ in., narrowly linear, flat or subconvolute, glabrous or hairy. Spike 5-16 in.; rachis stout, subterete, not grooved or notched; pedicels of involucels hispid; bristles \$\frac{1}{2}-\frac{1}{2}\$ in., all very slender, flexuous, often purplish, very unequal, villous below, quite free at the base; spikelets on the short branches of a hispid pedicel, outer often imperfect.

Var. triflorum, Stapf mss.; spike elongate dense-flowered. P. triflorum, Nees

in Herb. Koyle; Sleud. l. c. 107.

8. P. pedicellatum, Trin. in Mem. Acad. Petereb. Ser. vi. iii.

II. (1835) 184; annual, spikes dense-fid., rachis glabrous, spikelets in. solitary or geminate shortly pedicelled in the sessile involucels, bristles densely villous, gl. I very small oblong woolly, II broadly oblong apiculate 7-nerved, III = IV truncate 5-nerved tip toothed, IV lanceolate acute smooth shining. P. lanuginosum, Hochst. in Flora xxv. (1842), Beibl. i. 133; A. Rich. Tent. Fl. Abyss. ii. 385; Steud. Syn. Gram. 107; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 339. P. amoenum, A. Rich. l.c. 386. P. lanatum, Herb. Ham. ex Wall. Cat. n. 8647. P. implicatum, Steud. l.c. 107 (ex descr.). P. intertextum, Schlecht. in Bot. Zeit. ix. (1851) 878. Eriochaeta densifiora, nervosa & secundifora, Fig. et De Not. in Mem. Acc. Torin. Ser. II. xiv. (1854) 375-378.—Pennisetum, Wall. Cat. l.c.

BAJPOOTANA and BANDA; on Mt. Abu, Duthie. BEHAR, at Monghyr,

*Hamilton; Hazaribagh and on Parusnath, Clarke.-DISTRIB. Afr. trop.

Stems 1-9 ft., branched from the base and above, leafy. Leaves 6-10 by $\frac{1}{6}$ - $\frac{1}{6}$ in., flat, flaccid, glabrous or sparsely hairy. Spikes 2-5 in.; rachis notched; involucels quite sessile; outer bristles short, inner $\frac{1}{2}$ in. long, densely villous below the middle, flexuous, very unequal, pale. Spikelets with the pedicel and often the base of the lower glumes woolly; tip of gl. IV hispid.

9. P. setosum, Rich. in Pers. Syn. ii. 729 (excl. syn.); annual, peduncle and rachis of spike glabrous, spikelets 10 in. solitary in the sessile involucels, bristles 1-1 in. sparsely ciliate, gl. I minute or 0, II oblong cuspidate 5-nerved, III shorter than II oblong truncate 3-toothed 5-nerved, IV ovoid tip ciliate. Trin. Diss. ii. 66, Pan. Gen. 95, Sp. Gram. Ic. t. 20; Nees in Mart. Fl. Bras. ii. II. 305; Griseb. Fl. Brit. W. Ind. 555; Baker Fl. Maurit. 441. P. barbatum, Schult. Mant. ii. 147; Nees Agrost, Bras. 283; Kunth Enum. Pl. i. 163; Steud. Syn. Gram. 108. P. breve, Nees l. c. 281. P. ciliatum, Parl. in Hook. Niger Flora, 184. P. ciliares, Herb. Ham. ex Wall. Cat. n. 8640 A. P dasystachum, Desv. Opusc. (ex descr.) 76. P. elegans, Nees ex Steud. l. c. 105. P. flavescens, Prest Rel. Heenk. i. 316 (ex descr.). P. hirsutum, Nees Agrost. Bras. 284. P. holcoides, Schult, l. c. 148; Duthie Grass. N. W. Ind. 10, Indig. Fodd. Grass. t. 49, Fodd. Grass. N. Ind. 17. P. gracile, Benth. in Hook. Niger Fl. 564. P. intertextum. Herb. Ham. ex Wall. Cat. 8648. P. myurus, Parl. in Atti Riun. Ott. Sc. Ital. 586. P. pallidum, Nees Agrost. Bras. 185 (ex descr.). P. polystachyum, Schult. l. c. 146; Nees in Hook. Niger Fl. 563. P. purpurascens, H.B. & K. Nov. Gen. & Sp. i. 113; Nees l. c. 282; Kunth l. c. 160. P. Richardi, Kunth Revis. Gram. i. 49, 255, t. 39, Enum. 161. P. Sieberi, Kunth Revis. i. 49 (ex parte) ii. 877. P. tenuispiculatum, Steud. l. c. 107 (ex descr.) P. triticoides, Roem. & Sch. Syst. ii. 877. P. uniflorum, H.B. & K. l.c. t. 34. P. violaceum, Hort. ex Trin. Diss. ii. 67 (non Rich.). Gymnothrix Thouarii, Herb. Ham. ex Wall. Cat. n. 8645 A. (non Beauv.). Penicillaria ciliaris, Herb. Ham. l. c. n. 8646 A. Panicum Alopecuros, Lamk. Ill. i. 169; Encycl. iv. 739. Pan. barbatum, Roxb. Fl. Ind. i. 282; Wall. Cat. n. 8646 C. Pan. cenchroides, Rich. in Act. Soc. Hist. Nat. Par. i. (1792) 106. Pan. densispica, Poir. Encycl. Suppl. iv. 273. Pan. holcoides, Roxb. l. c. 285, Ic. ined. n. 784. Pan. polystachyum, Schult. Mant. ii. 146. Pan. triticoides, Poir. l. c. 274. Setaria cenchroides, Roem. & Sch. Syst. ii. 495. Cenchrus setosus, Sw. Prodr. Veg. Ind. Occ. 26 (excl. syn.). -Penniseti sp., Wall. Cat. n. 8646, 8648.

UPPER GANGETIC PLAIN, at Cawnpore (Herb. Wight). The CIRCARS; in cultivated ground among the mix., Raxburgh. Bengal, Behar, and Chota Nagpone.

—Distrib. Afric. and Amer. trop.

Stem erect, often stout and fastigiately branched at the nodes, green or purplish. Leaves 6-10 by \(\frac{1}{2} \) \(\frac{1}{2} \) in., flat, flaccid, glabrous or hairy. Spikes few or many, 2-4 in., usually purplish brown; rachis sleuder, deeply pitted; involucels close-set, at length spreading; bristles laxly but copiously ciliate below the middle, all slender and free at the base; gl. II. suddenly or gradually cuspidate; III with two obtuse lateral teeth at the tip and an acute median. Styles free at the base.—Possibly not indigenous in India.

10. P. borbonicum, Kunth Revis. Gram. i. 259, t. 41, Enum. Pl. i. 162, Suppl. 118; habit, &c. of P. setosum, but spikes longer 1 in. diam. across the bristles, spikelets & in., gl. II much longer than III acuminate. Gymnothrix Thuarii, Beauv. Agrost. 59. G. Thouarii, Steud. Nom. Ed. II.; 386. Panicum longisetum, Poir. Encyc. iv. 275 (Excl. Syn. Beauv.).—Pennisetum sp. Wall. Cat. n. 8645.

BENGAL; at Serampore, Carey; margins of fields, &c., Kurs. SILHET, Griffith. — DISTRIB. Bourbon.

A very doubtful native of India.

• Inner bristles of involuced dilated below, their bases confluent in a coriaceous disk.

11. P. cenchroides, Rich. in Pers. Syn. i. 72; peduncle and rachis of spike glabrons, spikelets 1 in. 1-3 in each pedicelled involucel, gl. I = Ill ovate acuminate nerveless, II = 1 IV ovate acuminate 1-nerved. Ill oblong truncate 5-nerved, IV lanceolate truncate or cuspidate. Beauv. Agrost. 59, t. 13, f. 5; Trin. Fund. Agrost. 171, t. xv., Diss, ii. 69, Pan. Gen. 93; Nees Agrost. Bras. 184, Fl. Afr. Austr. 70, in Linnwa, vii. 162; Kunth Enum. Pl. i. 162; Suppl. 119; Parlat. Fl. Ital. i. 108, in Webb. & Berth. Phyt. Canar. iii. III. 380, t. 244; Steud. Syn Gram. 105; Boiss. Fl. Orient. v. 445; Baker Fl. Maurit. 441; Wall. Cat. n. 8649; Aitchis. Cat. Panjab. Pl. 162; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 338; Duthie Grass. N.W. Ind. 10, Indig. Fodd. Grass. t. 12, 13, Fodd. Grass. N. Ind. 17. P. ciliare, Link. Hort. Berol. i. 213; Coss. & Dur. Fl. Alger. ii. 38. P. incomptum, Nees ex Steud. l. c. 105 (ex descr.). P. distylum, Guss. Ind. Sem. Hort. Bocc. 8, Fl. Sic. Prodr. i. 12; Bertol. Fl. Ital. i. 393. P. petreum, Steud. l. c. 106. PP. Vahlii, Kunth Revis. i. 49. P. rufescens, Spreng. Syst. i. 302; Kunth l. l. c. c. 162, ii. 117. Steud. l. c. Cenchrus Anjania, Herb. Ham. ex Wall. Cat. n. 8649 B. C. ciliaris, Linn. Sp. Pl. 302; Deef. Fl. Atlant. ii. 387. C. digynus, Schreb. ex Boiss. l. c. 449. C. longifolius. Hochst. ex Steud. l.c. C. mutabilis, Wight. Herb. C. pennisetiformis. Hochet. et Steud, ex Boiss. l. c. 448. C. rufescens, Desf. l, c. 388. Panicum vulpinum, Willd, Enum. Hort. Berol. 1031.

Plains and low hills throughout WESTERN INDIA, from Kashmir to the Upper Gangetic plain and southwd. (Absent from Ceylon.)—DISTRIB. Westwd. to Sicily,

trop. Afr. and the Canaries.

Stems tufted, 6-18 in., erect or decumbent and much branched from the base, stout or slender, leafy, or ascending from a branching often nodose rootstock, the sheaths of which are often woolly. Leaves 6-10 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., glabrous hairy or villous. Spikes \(\frac{1}{2}\)-\(\frac{1}{2}\) in., pale, rarely purplish; peduncie often flexuous; rachis scaberulous; involucels subsessile, outer bristles slender, squarrosely spreading; inner twice as long as the spikelets, thickened and ciliate below, filiform flexuous and scabrid above. Spikelets 3, polygamous, gl. III male or sometimes fem. with an obcordate ovary; IV coriaceous; styles nearly free at the base.

Var. echinoides; inner bristles of the involucel shortly connate above the basal disk. Cenchrus echinoides, Wight ex Steud. Nom. Ed. 11. i. 317; Syn. Gram. 109.

C. bulbosas, Freeen. es Steud. l. c. C. pennisetiformis, Hocket. es Steud. l. c. 109. C. setigerus, Herb. Heyne es Wall. Cat. n. 8649 A.; Aitchis. Cat. Panjab. Pl. 162. C. lappaceus, Tausch in Flora XX. (1837) 57.—The Panjab, Upper Gangetic Plain, and Deccan Peninsula, Arabis, Africa, Madeira. A nearer approach to Conchrus than P. conchroides, but at once distinguishable from that genus by the filiform tips of the bristles of the involucel. It occurs here and there in the same areas as P. conchroides, and passes into it.

12. P. Prieurii, Kunth Revis. Gram. ii. 411, t. 119, Enum. Pl. i. 162, Suppl. 119; habit of P. cenchroides, but involuced nearly twice as large, the longer bristles \(\frac{1}{2} \) in. long, the spikelets one or two sessile and gl. I minute or 0. Steud. Syn. Gram. 105. Cenchrus macrostachyus, Hochst. ex Steud. l. c. 109.

The PANJAB; Drummond (Herb. Duthie). RAJPUTANA; at Jeypoor, Duthie .-

DISTRIB. Afr. trop.

Quite glabrous. Stems tall, slender, erect, or short prostrate stout and much brauched, with geniculate leafy branches. Leaves 1-8 in., rigid, narrow with filliorm tips, scaberulous; sheath inflated; ligale of very fine hairs. Spikes on long exserted or short included peduncies, 2-4 in. long, 1½ in. diam. across the bristles, very pale; rachis slender, geniculately flexuous, compressed, quite smooth; involucels subsessile; bristles 1 in. flexuous, dilated and ciliate below. Spikelets in.; gl. I 0; II = III both ovate-lanceolate, cuspidately acuminate, 5-nerved; IV like III, but rather longer, 5-nerved; palea like the gl., 2-nerved. Anthers linear. Grain broadly orbicular-oblong, cuspidate, flattened.

DOUBTFUL SPECIES.

P. MEPALENSE, Spreng. Syst. i. 303 (to which Grisebach refers landsum, Kl.) differs according to the description from landsum in the coloured setse, which are not described as brunched, and in the habitat, Nepal, which is far to the east of the range of landsum. Sprengel's specimen is in all probability from Wallich, who alone had distributed plants from Nepal at that time.

15. CEMCERUS, Linn.

Characters of *Pennisetum*, but involucels composed of subulate hard spines without filiform tips, connate below into a short coriaceous cup, which is surrounded by erect or squarrose bristles.—Species few, tropical and subtropical.

1. C. biflorus, Roxb. Fl. Ind. i. 233; involucels rounded at the base, inner spines subulate-lanceolate erect puberulous dorsally flat with thickened margins, outer short or long erect or sub-squarrose. Kunth Enum. Pl. i. 167; Steud. Syn. Gram. 110; Wight Cat. n. 1664; Dalz. & Gibs. Bomb. Fl. 294; Aitchis. Cat. Panjab. Pl. 163 (triflorus); Duthie Grass. N.W. Ind. 9. C. bulbifer, Hochst. ew Boise. Fl. Orient. v. 448. C. echinatus, Wall. Cat. n. 8854 B.C. C. montanus, Nees in Royle Ill. Himal. Pl. 416 (name); Steud. l.c. 111; Boiss. l.c. Aitchis. l.c.; Duthie Grass. N.W. Ind. 9, Indig. Fodd. Grass. t. 48, Fodd. Grass. N. Ind. 16. C. quinquevalvis, Herb. Ham. ex Wall. l.c. C. C. Schimperi, Hochst. ex Steud. Nom. Ed. II. i. 317. C. tripsacoides, Br. in Salt Voy. Abyss. App. 62 (nomen). C. uniflorus, Ehrb. ms. ex Boiss. l.c.

The Panjab and Upper Gangetic Plain, Royle, &c. The Concan and Scind, Stocks. Rajfootana, Duthie. Coromandel, Rosburgh, &c.—Dietrie. Beluchistan,

Arabia, Africa.

Annual? Stem erect, 6-24 in., simple. Leaves narrow, glabrous or hairy, mouth of sheath hairy. Spikes 2-4 in., solitary, cylindric, green; rachis flexuous,

angular, smooth; involucels loosely imbricate, spines sometimes hooked at the tip, inner \(\frac{1}{2} - \frac{1}{2} \) in. long, as long as the seasile spikelets.

2. G. catharticus, Delile Cat. Hort. Monep. 1838, in Linnea xiii. (1839) Litterb. 103; base of involucels turbinate or truncate, inner spines squarrosely spreading subulate dorsally deeply grooved, margins ciliate or scaberulous, outer spreading or reflexed. Steud. Syn. Gram. 130; Pluthie Grass. N.W. Ind. 9, Indig. Fodd. Grass. t. xi., Fodd. Grass. N. Ind. 15; Boiss. Fl. Orient. v. 448. O. annularis, Anderes. in Peters. Reise Mossamb. Bot. 553. C. echinatus, A. Rich. Tent. Fl. Abyss. ii. 389; Wall. Cat. n. 8654, A.D. Aitchis. Cat. Panjab. Pl. 163; P Duthie Grass. N.W. Ind. 9 (non Linn.). C. Lapets, Herb. Ham. ew Wall. l.c. D. C. nilotious, Fig. & Notar. in Mem. Accad. Torin. (1854), 380. Elymus Caput Medusæ, Forsk. Fl. Æg. Arab. 25 (non Linn.).

The PANJAB and UPPER GANGETIC PLAIN, Hamilton, Royle, &c.—DISTRIB. Arabia, Afric. trop.

Quite glabrous. Stem geniculately ascending, branched from the base, leafy. Leaves 1-3 in., lanceolate, finely acuminate, scaberulous; sheath inflated. Spikes 1-6 in., usually more or less enclosed in the uppermost leaf-sheath; rachis flavous, smooth; involucels 1-1 in. across the spreading spines. Spikelets 1 in., 1-2-fld.; gl. I membranous; II and III hyaline, ovate, acuminate, 5-nerved; IV ovate-lanceolate, cuspidately acuminate.—Resembles Pennisetum cenchroides, but at once recognized by the rigid involucel spines. Duthie's figures under the names of catharticus and montanus are not recognizable. The widely distributed C. schinatus, Linn., is very closely allied, but should be recognized by the broader spines of the involucel. I doubt its being distinct.

16. STENOTAPHRUM, Trin.

Coarse grasses. Stem flattened. Leaves distichous. Spikelets spicate, partially sunk in one face of a broad flat herbaceous rachis, usually biseriate, ovate, acuminate, 1-fld., dorsally flattened, sometimes on short flat appressed branches of the rachis; rachis simple or jointed, tip acute. Glumes 4; I short, broad, rarely 0; II convex, empty; III as long as II, flat, paleate, empty or triandrous; IV equalling III, coriaceous, bisexual; palea large, ovate, acute, coriaceous. Anthers linear. Styles free. Grain broad, flattened, free within the hardened glume and pale.—Species 2 or 3. tropical.

1. S. glabrum, Trin. Fund. Agrost. 176, Gram. Panic. 60; gl. I very short truncate membranous nerveless. Nees Agrost. Bras. 92; Doell in Mart. Fl. Bras. ii II. 301, t. 39. S. americanum, Schrank Pl. Rar. Hort. Monac. 98, t. 98, in Flora, vii. (1824) Beib. 27, 28; Kunth Enum. Pl. i. 138; Benth. Fl Austral. vii. 501; Griseb. Fl. Brit. W. Ind. 544. S. complanatum, Schrank in Flora l. c. 26; Kunth Enum. l. c. 137; Nees l. c. 93; Thwaites Enum. Pl. Zeyl. 361; Trim. Cat. Ceyl. Pl. 106; Baker Fl. Maurit. 440. S. dimidiatum, Brong. Bot. Voy. Coq. 127; Wight Cat. n. 1606. S. glabrum, Trin. l. c. 175; Nees l. c. S. Koenigii, Schrank l. c. S. amadagascariense, Kunth Revis. Gram. ii. 163, t. 211; Enum. Pl. i. 524, Suppl. 99; Steud. l. c. 118. S. sarmentosum, Nees in Mart. Fl. Bras. ii. 93; Fl. Afr. Austr. 63. S. Swartzianum, Nees Fl Afr. Austr. 62. Rottboellia complanata, Sw. in Ges. Fr. Naturf. Berl. Mag. iv. (1810) 89, t. 5; Schrank l. c. R. compressa, Beauv. Agrost. 109, t. 21, f. 8.

B. dimidiata, Thunb. Prodr. Fl. Cap. 23. R. paleacea, Stoud. ex Doell in Mart. Fl. Bras. ii. II. 301. R. tripsacoides, Lamk. Illustr. i. 205, t. 48, f. 1. Panicum dimidiatum, Linn. Syst. Ed. xiii. 90; Willd. Sp. Pl. i. 339; Retz. Obs. vi.; Roxb. Fl. Ind. i. 287. P. poæforme, Bojer Hort Maurit. 365. Diastemanthe platystachys, Steud. l. c. 360. Ischemum secundatum, Walt. Fl. Carol. 249.—Stenotaphrum. Wall. Cat. 8673.

PLAINS throughout India.—DISTRIB. Tropics generally.

Stem stout, creeping below; branches 2 in. to 2 ft. high. Leaves 3-6 in. by \(\frac{1}{2} \) in. broad or less; sheath broad, flat; ligule a ring of fine hairs. Spike erect, 2-4 by \(\frac{1}{2} \) \(\frac{1}{2} \) in. not or obscurely jointed; branches when present \(\frac{1}{2} \) in. by \(\frac{1}{2} \) in., erect. Spikelets \(\frac{1}{2} \) in. long; gl. I about \(\frac{1}{2} \) II, orbicular; II thin, ovate, acuminate, 7-nerved; III lanceolafe, acuminate, margins thickened obscurely incurved.—Very variable in the number and arrangement of the spikelets.

2. S. : Melferi, Munro in Cat. Pl. Griff. Fulc., &c. (1865) ined.; gl. I half as long as III ovate-oblong strongly 3-5-nerved.—Panicum dimidiatum, Heyne in Herb. Rottl.

TENASSERIM, Helfer. MALAY PRIINSULA; Plus river, Wray; Quedah, King's Collector; "Hengeiturei, Feb. 12th, 1796," Heyne? in Herb. Rottler.—DISTRIB. Tonkin.

Stem 1-2 ft., as thick as a crow-quill or thicker, base decumbent geniculate. Leaves 6-10 by \(\frac{1}{2}\)-\frac{1}{2} in., strap-shaped, upper acuminate, lower obtuse apiculate; sheath broad, flat; ligule a ring of short hairs. Rachis of spikes 3-6 by \(\frac{1}{2}\)-\frac{1}{2} in., straight or flexuous, not jointed; spikes \(\frac{1}{2}\)-\frac{1}{2} in.; spikelets 3-6, imbricate, \(\frac{1}{2}\)-\frac{1}{2} in. long, ovate, acute; gl. I obtuse; II lancelate, thin, 7-nerved; III = II, 5-nerved, paleate, male; IV chartaceous, dorsally flattened ovate, beaked, smooth.—Heyne's specimen is probably from the Malay Peninsula, from whence he received plants; it is accompanied by one of S. glabrum.

17. THUAREA, Pers.

A small much-branched prostrate leafy littoral grass. Leaves short, flat. Spike terminal, included in a leaf-sheath; rachis flat, herbaceous, base at length accrescent and enveloping the spike. Spikelets uniseriate, jointed on one face of the rachis, 4-6 upper male, 2-fld.; 1-2 lower fem. or bisexual. Glumes 3-4; I small, hyaline, or in males 0; II empty; III and IV subequal, triandrous in the males; IV of the lower spikelets rigid, thin, bisexual, paleate. Anthers linear. Styles distinct. Grain free within the glume, but with the rest of the spikelets closely enveloped by the thick hardened base of the rachis, which forms an obconic caducous nut with a free deflexed and incurved beak.

T. sarmentosa, Pers. Syn. i. 110; Kunth Revis. Gram. i. 247, t. 35, Enum. Pl. i. 174, Suppl. 128; Beauv. Agrost. 127, t. 22, f. 9; Steud. Syn. Gram. 112; Thw. Enum. Pl. Zeyl. 363; Trim. Cat. Pl. Ceyl. 106; Benth. Fl. Hongk. 415, Fl. Austral. vii. 502. T. latifolia and media, Br. Prodr. 197; Kunth Enum. l. c. 173, 174. T. involuta, Br. l. c.; Mig. Fl. Ind. Bat. iii. 473. Ornithocephalochloa arenicola, Kurz in Trim. Journ. Bot. iv. (1875) 332, t. 171. Isohæmum involutum, Forst. Prodr. 73.

CEYLON, the LACCADIFE and NICOBAR ISLDS.—DISTRIB. Malay Islds., Mada-

gascar, Australia, Polynesia.

Leauss 1-2 in., linear-oblong, acute, glabrous or silky; sheaths broad, silky; ligule of hairs. Spikes \(\frac{1}{2}\)-1 in. Spikelets \(\frac{1}{2}\) in. Glumes obtuse, ciliate, I minute; II ovate-oblong, 5-nerved; III much broader, 5-nerved; IV oblong-lanceolate, tip

ciliate. Fruit \(\frac{1}{2} \) in. long and broad, trigonously obconic or turbinate, obscurely ribbed, with a deep depression on one side of the crown.

Tribe II. ORYZEÆ. (See p. 3.)

18. ORYZA, Linn.

Leafy tall grasses. Leaves long, flat. Spikelets jointed on the slender branches of an elongate rarely spiciform panicle, 1-fld., oblong, laterally compressed, pedicels annular at the top. Glumes 2-3, 1 and II much the smallest, empty, scale or bristle-like, rarely 0; III chartaceous, obtuse acute or awned, strongly 3-5-nerved; palea as long as the gl., keeled. Lodicules 2, 2-lobed, rarely entire. Stamens 6, anthers linear. Styles short, free; stigmas laterally exserted. Grain narrow, free or adnate to the gl. and palea.—Species 5-6, tropical.

The gl. IV of most authors, is here considered to be a palea, as is indicated by the positions of the lodicules and stamens in relation to it.

1. O. sativa, Linn. Sp. Pl. 333; ligule long 2-partite, spikelets loosely panicled \(\frac{1}{2} \) in. long, gl. I and II \(\frac{1}{2} \) the length of III lanceclate, III hispid above dorsally spinescently ciliate, awn very long. Gærtn. Fruct. ii. 5, t. 80, f. 5; Host Gram. Austr. iv. t. 325; Lamk. Encycl. t. 264; Kunth Enum. Pl. i. 7, Suppl. 4; T. Nees Gen. Fl. Germ. Monocot. i. 2; Steud. Syn. Gram. 3; Roxb. Fl. Ind. ii. 200; Wall. Cat. n. 8632; Griff. Notul. iii. 5, Ic. Pl. Asiat. t. 139, f. 149; Dalz. & Gibs. Bumb. Fl. Suppl. 98; Duthie Grass. N. W. Ind. 12, Field & Gard. Crops. 15, t. 4, Fodd. Grass. N. Ind. 20; Mig. Fl. Ind. Bat. iii. 368; Doell in Mart. Fl. Bras. ii. II. 7, t. 1; Benth. Fl. Austral. vii. 550. O. fatua, Koen. ex Trin. in Mem. Acad. Petersb. Ser. 6, ii. II. (1839) 177. O. rufipogon, Griff. l.l. c.c. & t. 145, f. 2, & t. 139, f. 147. O. palustris, Salisb. Prodr. 25. O. repens & palustris, Herb. Ham. ex Wall. l.c. F. ex Steud. l.c. O. segetalis, Russ. ex Wall. l.c. B. O. sorghoides, Steud. l.c.

Indigenous in marshes of Rajpootana, Sikkim, Bengal, the Khasia Hills, Central India, The Circars and Prou. Cerlor, Ferguson.—Distrib. Austral. trop.

Annual. Stems 2-10 ft., creeping or floating. Leaves 1-2 ft. by 1-1 in. or more, flat, striated, 1-nerved, scaberulous; sheaths smooth. Passels at length drooping. Ppikelets not imbricating, awn 3-5 in. long, yellow or reddish, shining.—
I have described above the plant which Roxburgh and other Indian authors consider to be the indigenous Rice, and who have collected it as such in the localities mentioned above, as I have in hot valleys of Sikkim and the Khasia Hills. It resembles in all essentials a commonly cultivated awned sort. I have seen no specimens of Griffith's O. rufpogon, which he describes as a very different-looking plant, but his characters are not diagnostic, and a memorandum by Munro (in Herb. Kew) states that he can find no real distinction for it. For the cultivated varieties of Rice in India, see Watt. "Dictionary of the Economic Products of India," vol. v.—The awnless O. denudata, Steud, Non. Ed. I. 577 (O. mutica, Steud. l. c.; Lour. Ft. Cockisch. i. 267, O. sativa, ser. submutica, Mig. Ft. Ind. Bat. iii. 369), is a cultivated form.

2. O. latifolia, Dev. Journ. Bot. i. (1818) 77; ligule ve.y short, branches of panicle very long often whorled, spikelets subimbricate oblong beaked, gl. I and II = 1-1 III lanceolate, III hispid finely granulate awn

as long or twice as long as the gl. Kunth Revis. Gram. i. 185, t. 4, Enum. Pl. i. 7, Suppl. 4. O. officinalis, Wall. & montans, Ham. Wall. Cat. n. 8635, 8633. O. platyphylla, Sch. f. Syst. vii. II. 1364.

Low valleys in SIKKIM, ASSAM, SILHET, CACHAR, MUNNEPORE, CENTRAL INDIA,

and BURMA. - DISTRIB. Trop. As. Afr. and Amer.

Stems up to 6 ft., tufted, as thick as a swan's quill below. Leaves 1-2 ft. by. \(\frac{1}{2}-1\frac{1}{2}\) in., nearly smooth, many-nerved; midrib slender, shining beneath; sheath very long. Branches of panicle 4-8 in., very slender; pedicels and branchlets bearded at the base. Spikelets \(\frac{1}{2}-\frac{1}{2}\) in.; gl. III and palea hairy.

Var. collina; gl. I and II minute or O. O. sativa, Theaites Enum. Pl. Zeyl. 357. O. sativa var. collina, Trim. mss.—Ceylon; hills about Colombo and in the

Western Provinces.

3. O. granulata, Nees et Arn. in Wight Cat. n. 2354, ex Wall. Cat. n. 8634; ligule very short, spikelets in simple racemes obtuse awnless; gl. I and II minute or 0, III and palea glabrous granulate. Steud. Syn. Gram. 3. O. filiformis, Herb. Ham. ex Wall. l. c. O. triandra, Herb. Heyne ex Steud. l. c. Padia Meyeriana, Zoll. & Mor. Verz. 103; Mig. Fl. Ind. Bat. iii. 373; Steud. l. c. 3.

In dry woods; Sikkim Himalawa, the Khasia, and Behab Hills. Malabau and Madura, Heyne, Wight, &c. Ceylon; at Rambukkana, Trimen.—Distrib. Java.

- Stems 2-3 ft., slender, tufted. Leaves 3-6 by \(\frac{1}{2} \) in., thin, midrib beneath and nerves distinct; sheath very long. Racemes very slender, on very long slender peduncles; rachis flexuous, rarely with a short branch at the base. Spikelets shortly pedicelled, \(\frac{1}{2} \frac{1}{2} \) in. long.
- 4. O. Eddleyi, Hook. f; very slender, leaves thin nerves distinct, ligule long, panicle with solitary alternate branches, spikelets \(\frac{1}{2} \frac{1}{2} \) in., gls. I and II setaceous, III thinly chartaceous scabrid narrowly oblong dorsally spinulose-ciliate narrowed into an awn of about its own length.

MALAY PENINGULA; Pahang, in dense thickets, Ridley.—DISTRIB. Borneo. Stem 2-3 ft., weak, as thick as a crow's quill below. Leaves 12 by \(\frac{1}{4}\) in, nearly smooth; sheath long, slender. Panicle 12 in; branches sometimes 6 in. and rachis very slender; pedicels \(\frac{1}{10}-\frac{1}{4}\) in.—Habit of O. granulata, but spikelets more like O. coarctata.

5. O. coarctata, Roxb. Fl. Ind. ii. 206; tall, stout, leaves coriaceous caudate-acuminate spinulose-serrate nerves obscure, ligule very short, panicle spiciform, branches few-fid., spikelets \(\frac{1}{2} \) in., gl. I and II setaceous, III narrowly dolabriform quite smooth dorsally winged tip narrowed into a short rigid awn quite smooth. Wall. Cat. n. 8646; Griff. Notul. iii. 8, Ic. Pl. Asiat. t. 142, f. 1; Miq. Fl. Ind. Bat. iii. 371. O. triticoides, Griff. Notul. l. c. Sclerophyllum coarctatum, Griff. l. c.

SUNDEBBUNDS, Hamilton, Rosburgh, &c. SCIND, at Shikarpur (Herb. Duthie). Stem 4-6 ft., erect from a stout creeping rhizome, branching, smooth, hard, polished. Leaves 6-12 by \(\frac{1}{2}\) in., unequal-sided, rigid, smooth or scaberulous, nerves and midrib obscure, tips long slender; sheath long, undulately reticulate, polished. Panicle 4-6 in., rachis and branches trigonous, atiff, quite smooth; pedicela clavate at the top and then contracted below the dilated cupular tip. Spikelets laxly imbricate, rigidly chartaceous; gl. I and II not half as long as III, erect; III strongly laterally often obliquely compressed, keeled, keel dilated above into a rounded wing, obscurely 7-9-nerved, lateral nerves submarginal; palea chartaceous, as long as the gl., oblong-lanceolate, acuminate, plicate, 5-nerved, median

nerve faint, two intermediate very stout, lateral more slender. Lodicules large, membranous, subquadrate or trapeziform. Anthers very long and slender. Overy narrow, elongate. Grain not seen.—A very remarkable species. In Geu. Plant (iii. 1117) this is by oversight stated to be Himalayan.

19. LEBRSIA, Sw.

Characters of Orzya, but empty gls. 0; fl. gls. thinner not awned, keel and margin ciliate; stamens 6, 3 or fewer.—Species 7, chiefly American.

1. L. hexandra, Sw. Prodr. Veg. Ind. Occ. 21, Fl. Ind. Occ. i. 131; paniele contracted, stamens 6. Fl. Dan. t. 1744; Kunth Enum. Pl. i. 6; Host Gram. Austr. t. 35; Engl. Bot. t. 2908; Reichb. Ic. Fl. Germ. i. t. 52; T. Nees Gen. Fl. Germ. Monocot. i. n. 1; Wall. Cat. n. 8637; Thw. Enum. 356; Trim. Cat. Ceyl. Pl. 106; Duthie Grass. N.W. Ind. 12; Miq. Fl. Ind. Bat. iii. 367; Benth. Fl. Austral. vii. 549. L. australis, Br. Prodr. 210; Kunth l. c. 6. L. ciliata, Roxb. Fl. Ind. ii. 207; Aitchis. Cat. Panjab. Pl. 157; Duthie l. c., Fodd. Grass. N. Ind. 21. L. ciliaris, Griff. Notul..iii. 2. L. glaberrima, Trin. Oryz. 7; Miquel l. c. 368. L. mexicana, H. B. & K. Nov. Gen. & Sp. i. 195; Kunth l. c. 6, & ii. 2, Suppl. 2; Revis. Gram. 178, t. 1. Zizania ciliata, Spreng. Syst. ii. 136; Kunth Revis. Gram. i. 8; Griff. Notul. iii. 1. Oryza ciliata, Herb. Ham. ex Wall. Cat. n. 8637 B. O. hexandra, Doell in Mart. Fl. Bras. ii. II, 10. Pharus ciliatus, Retz. Obs. v. 23. Pseudoryza ciliata, Griff. Ic. Pl. Asiat. t. 144, f. 1. Turraya napalensis, Wall. Cat. 8637 D. Blepharochloa ciliata, Endl. Gen. 1352; Steud. l. c. 4.

LOWER HIMALAYA; in marshes, from Nepal eastward to Assam and Burma, and southward to the Malay Peninsuls and CEYLON.—DISTRIB. Trop. Afric., Amer., and Austral.

Stem 2-4 ft., weak, base rooting; nodes villous. Leaves erect, 8-12 in. by $\frac{1}{3}$ in., flat; ligule truncate. Panicle 2-4 in., oblong, branches subsrect or spreading flexuous, few-fld. Spikelets $\frac{1}{3}$ in., dimidiate-oblong, smooth or scaberulous, pule green; keel of gl. and palea rigidly ciliate.

2. In oryzoides, Sw. Prodr. Veg. Ind. Occ. 21, Fl. Ind. Occ. i. 132; panicle effuse, stamens 3. Host Gram. Austr. i. t. 35; Kunth Enum. Pl. i. 5, Suppl. 1; Reichb. Ic. Fl. Germ. i. t. 52. Oryza clandestina, A. Br. es Aschers. Fl. Brandenb. 799. Asprella oryzoides, Lamk. Ill. i. 167; Roem. & Sch. Syst. ii. 266. Homalocenchrus oryzoides, Mieg. ex Poll. Hist. Pl. Palat. i. 52. Phalaris oryzoides, Linn. Sp. Pl. 55 (excl. cit.); Schreb. Beschr. Græse, vi. t. 22.

KASHMIR, Falconer, Thomson.—DISTRIB. Trop. and temp. regions.

Stem 2-3 ft., nodes villous. Leaves glaucous, scaberulous; sheath compressed; ligule lacerate. Panicle 8-7 in., base embraced by the upper leaf-sheath. Spikelets few, remote, \(\frac{1}{2}\) in. long.

20. HYGRORHIZA, Nees.

A floating glabrous grass. Leaves short, broad, flat. Spikelets few, lanceolate, 1-fld., shortly pedicelled on the few branches of a broad spreading panicle, articulate on the annulate tip of the pedicel. Glume solitary (empty gls. 0), flg. membranous, lanceolate, narrowed into a long awn, 5 nerved, keel and nerves ciliate; palea acuminate, 3-nerved, keel scabrid. Lodicules 2, gibbous. Stamens 6, anthers very long. Styles short, free, stigmas

laterally exserted. Grain narrowly oblong, free within the membranous glumes.

H. aristata, Nees in Edinb. New Phil. Journ. xv. (1833) 380; Steud. Sym. Gram. 5; Thw. Enum. Pl. Zeyl. 356; Trim. Cat. Ceyl. Pl. 106; Duthie Grass. N.W. Ind. 12, Fodd. Grass. N. Ind. 20; Aitchison Cat. Panjab Pl. 167; Wall. Cat. n. 8638; Wight Cat. n. 1739. Leersia aristata, Roxb. Fl. Ind. ii. 207; Griff. Notul. iii. 3; Steud. l. c. Pharus aristatus, Retz. Obs. v. 23. P. natans, Herb. Russel, ex Wall. l. c. Zizania aristata, Kunth Revis. Gram. i. 8, Enum. Pl. i. 10. Z. Retzii, Spreng. Syst. ii. 136. Potamochloa Retzii, Griff. Notul. iii. 3, 8, Ic. Pl. Asiat. t. 139, f. 147, & t. 140.—Rheedê Hort. Mal. x. t. 12.

. UPPER and Lower Gangetic Plains, Assam, Chittagong, Pegu, the Deccan

and CETLON. - DISTRIB. Tonkin.

Stem as thick as a crow-quill, 12-18 in. long, with feathery whorled roots at the nodes. Leaves 1-3 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., ovate-lanceolate to linear-oblong, scaberulous above; base and tip rounded, or tip acute and base cordate; sheath broad, inflated, compressed, mouth auricled; ligule 0. Panicle 2-3 in. long, and broad triangular, branches few, spreading, slender, lower whorled, often deflexed. Spikelets \(\frac{1}{2}\) in. long, pale green, pedicels articulate with a red annulus below the middle. Glume dorsally convex; palea as long, awn longer than the gl.

21. LEPTASPIS, Br.

Tall monœcious grasses. Leaves petioled, elliptic-oblong, flat, nervules trabeculate. Panicle terminal, erect; branches whorled, long, stiff, bearing a raceme of spikelets at their tips, of which the upper are male. Spikelets not jointed on the very short pedicels. Male, glumes 3, I and II small, ovate, empty, 5-7-nerved, spreading; III paleate, hexandrous; filaments short, anthers long. Fem. a utricle open at the top, enclosing the ovary and a linear palea, the tip of which is exserted. Lodicules small, truncate. Styles 3, very long. Grain free within the inflated accrescent utricle.—Species 3 or 4, tropical Asia, Africa, and Australia.

1. L. urceolata, Br. in Benn. Pl. Jav. Rar. 23, t. 6; leaves 7-12 in. long-petioled elliptic-lanceolate or oblanceolate, branches of paniele many stout, utricles turbinately pyriform. Wall. Cat. n. 8901; Miq. Fl. Ind. Bat. iii. 374; Steud. Syn. Gram. 8; Thiv. Enum. Pl. Zeyl. 357; Trim. Cat. Ceyl. Pl. 106. L. zeylanica, Neesex Steud. l. c. L. manillensis, Steud. l. c. Pharus urceolatus, Roxb. Fl. Ind. iii. 611.

PENANG, Roxburgh. Johobb, King's Collector. Ceylon, Thwaites .- Distrib.

Java, Sumatra.

Rootstock creeping; stem 2-3 ft. Leaves subdistichous, 2-4 in. broad, abruptly acuminate; petiole \frac{1}{2}-2 in.; sheath 3-10 in., flattened. Panicle 6-12 in. long; lower branches 6-10 in. Fem. spikelets \frac{1}{2} in. long.

2. L. cochleata, Thw. Enum. Pl. Zeyl. 357; leaves 4-10 in. shortly petioled oblong-lanceolate, branches of panicle few slender, utricles oblong incurved 5-ribbed tomentose with hooked hairs. Trim. Cat. Ceyl. Pl. 106.

CEYLON; in the Central Province, alt. 4000 ft., Thwaites.

Stems 2-3 ft. from a procumbent base. Leaves 1\frac{1}{2}-1\frac{2}{3} in. broad, acuminate; petiole \frac{1}{2}-\frac{2}{3} in.; sheath 1-3 in. Panicle 6-8 in.; branches 3-4 in., ternately whorled. Fem. spikelets \frac{1}{10} in.; glumes broadly ovate, acuminate. Utricle \frac{1}{2} in. long. Grain not seen.

TRIBE III. ZOYSIEM. (See p. 3.)

22. TRACHYS. Pers.

An annual diffuse softly villous grass. Spikes 2- rarely 3-nate, terminal, flattened, rigid, flexuous, jointed. Spikelets 1-fld., in alternate subsessile fascicles which are jointed on the under surface of the spikes, and are formed of 1-3 perfect sessile spikelets mixed with squarrose flowerless gls. Glumes of perfect spikelets 4, I minute, triangular, coriaceous, nerveless; II narrow, linear-lanceolate, membranous, 3-5-nerved, nerves ciliate below the middle; III much the largest, broadly obovate-oblong, cuspidately acuminate, rigidly coriaceous, 9-nerved epaleate; IV much smaller, ovate-lanceolate, cuspidately acuminate, chartaceous, 1-nerved; palea lanceolate, chartaceous, nerveless. Lodicules very minute, hyaline. Stamene 3, anthers linear. Styles long, free, stigmas long. Grain broadly oblong, compressed, free within the gl. and pale.

The above description differs from any that I have met with. Gl. III of the perfect spikelet is much larger than any of those of the imperfect spikelets, which form a squarrose tuft around the perfect.

T. mucronata, Pers. Syn. i. 85; Beauv. Agrost. 107, t. 21, f. 7; Kunth Enum. Pl. i. 168, Suppl. 123; Thw. Enum. Pl. Zeyl. 362; Trim. Cat. Ceyl. Pl. 106; Miq. Fl. Ind. Bat. ii. 472; Wall. Cat. n. 8674; Wight Cat. n. 1660. T. muricata (error for mucronata), Steud. Syn. Gram. 112. Cenchrus muricatus, Linn. Mant. 302; Schreb. Beschr. Graes. ii. 69, t. 34. C. tripsaceus, Herb. Linn. ex Munro in Journ. Linn. Soc. vi. (1862) 55. Trachystachys geminata, A. Dietr. Sp. Pl. ii. 16. Tripsacum distachyum, Herb. Linn. ex Munro l. c. Trachyozus muricata, Steud. l. c. 112. Panicum dimidiatum, Burm. Fl. Ind. 25, t. 8, f. 3. P. squarrosum, Rets. Obs. iv. 15, v. t. 1; Roxb. Cor. Pl. iii. 4, t. 206; Fl. Ind. i. 288.

The DECCAN PENINSULA; sandy ground near the sea; Hoyne, Rosburgh, &c. CEYLON; Jaffna, Gardner.

Stems 1-2 ft., weak, geniculate, rooting at the nodes. Leaves 2-6 by \(\frac{1}{2}\) in., linear-lanceolate, acuminate, flaccid, rarely nearly glabrous, margins often crisped; mouth of sheath hairy; ligule obscure. Peduncle long or short. Spikes 2-3 in., asssile or shortly peduncled, costa of rachis stout, margins broad, green; joints concave subquadrate. Spikesets (perfect) \(\frac{1}{2}\) in. long, sessile or very shortly stoutly pedicelled, pale, shining, terminal one on the spike solitary; gl. II very much narrower than III, and not overlapping the base of the latter or hardly, epaleate; III nearly flat, with the margins incurved; IV with the palea terete, margins strongly incurved over the palea.—The structure of gl. II is very peculiar; at first sight it may be taken for a narrow membranous palea of III, its lower insertion to which and axtarior position are difficult to distinguish.

23. TRAGUS, Haller.

A low rigid perennial grass. Leaves small. Spikelets 1-fld., 2-5-nate in narrow spikes, not articulate on the pedicels; rachis alender. Glumes 2; I thickly coriaceous, oblong-lanceolate, 5-ribbed, ribs with long recurved spines embracing II which is chartaceous, oblong, apiculate, 1-nerved, acaberulous; pales hyaline, obtuse, involute, faintly 2-nerved below. Stamens 3, anthers very long. Styles short, distant, stigmas short. Grain linear, free within the glumes.

T. racemosus. Scop. Introd. Hist Nat. 73; Desf. Fl. Atlant. ii. 386; T. Nees Gen. Fl. Germ. Monoc. i. n. 25; Trimen Cat. Ceul. Pl. 106; Duthie Grass. N.W. Ind. 13, Indig. Fodd. Grass. t. 14, Fodd. Grass. N. Ind. 22. T. muricatus, Moench Meth. 53. T. alienus, biflorus, & Berteronianus, Schult. Mant. ii. 205. T. brevicaulis, Boiss. Diagn. Ser. I. xiii. 44. T. occidentalis & orientalis, Nees Agrost. Bras. 286; Doell in Mart. Fl. Bras. ii. II. 286, t. 28. T. Halleri, Doell l. c. 122. T. bistorus, Nees ex Wight Cat. 1661. Lappago racemosa, Honck. Syn. Pl. Germ. i. 440; Host Gram. Austr. i. t. 36; Sibth. Fl. Greec. ii. t. 101; Kunth Enum. Pl. i. 169, Suppl. 124; Steud. Syn. Gram. 112; Reichb. Ic. Fl. Germ. i. t. 30; Wall. Cat. n. 8675; Thw. Enum. Pl. Zeyl. 362; Aitchis. Cat. Panjab. Pl. 163; Benth. Fl. Austral. vii. 506; Miq. Fl. Ind. Bat. iii. 473. L. biflora, Roxb. Fl. Ind. i. • 281; Grah, Cat. Bomb. Pl. 234. L. aliena, Spreng. Neue Entdeck. iii. 15, Syst. Pl. j. 266; Steud. l. c.; Dalz. & Gibs Bomb. Fl. 295. L. occidentalis. Nees in Schimp. Pl. Arab. Fel. Ed. ii. n. 793. Cenchrus racemosus, Linn. Sp. Pl. 1049; Schreb. Beschr. Graes. 45, t. 4. C. linearis, Lam. Fl. Franc. iii. 631. C. muricatus, Herb. Russ. ex Wall. l. c. A. Phalaris muricata. Forsk. Fl. Æg. Arab. 302. Aira malatrina, Herb. Ham. ex Wall. l.c. D.

Dry plains of INDIA; from Kashmir to Upper Bengal, and southward to CEYLON.

BUBMA, Wallich .- DISTRIB. Warm regions generally.

Steins erect in the first year, 4-8 in. high, leafy nearly to the spikes, then sending from the base rooting and leafing fig. stolons all round. Leaves very variable, smooth or scaberulous, ovate and ½ in. long, or narrower and 1-1½ in. long, acuminate, margins and mouth of sheath ciliate. Spikes 1-4 in., rachis and very short pedicels pubescent. Spikelets ½-½ in., crowded, in pairs face to face, simulating one spikelet with 2 equal spinous glumes. Gl. II with broad hyaline margins towards the tip.—In all Indian specimeas I find the spikelets in pairs, each with 2 gl. I have not seen the fascicled spikelets described in Gen. Plant. A small lower gl. is described as sometimes present, and 5 spikelets as occurring on a single pedicel.

24. LATIPES, Kunth.

A perennial rather rigid grass. Leaves subulate, convolute. Spikelets 1-fld., in simple subspiciform racemes, biseriate (one usually imperfect) persistent on the flattened truncate spreading articulate pedicels; rachis flexuous. Glumes 3, I and II empty, thickly coriaceous, I usually longest, narrow, recurved, 3-nerved, subspinously pectinate, dorsally smooth; II lanceolate, spinously tubercled, embracing III (flg.), which is shorter, hyaline, oblong, acute, ciliate; palea minute, linear-oblong, nerveless. Lodicules 2, hyaline. Stamens 3, anthers oblong. Styles free. Grain free, obliquely ovate-lanceolate.

L. senegalensis, Kunth Revis. Gram. i. 261, t. 42, Enum. Pl. i. 171, Suppl. 125; Duthie Grass. N.W. Ind. 13, Fodd. Grass. N. Ind. 22. Lappago Latipes, Steud. Syn. Gram. 112. T. senegalensis, J. Guy ex Kunth Enum. l. c.

SCIND, at Kurrachee, Stocks. Beluchistan, Frere. - Distrib. Arabia, Abyssinia,

Senegal.

Stems 3-10 in. wiry, creeping with many erect or spreading branches, leafy up to the racemes. Leaves 1-3 in.; lower sheaths short, mouth hairy; ligule O. Racemes 2-6 in.; rachis glabrous; pedicels distant, narrowly cuneiform, margins winged ciliate. Spikelets \(\frac{1}{2}\)—in., reddish-brown.—The Indian specimens are small. The pedicels are flattened and bear normally 2 spikelets, one well developed and fertile, the other imperfect with gl. I and II narrower of equal length and irregularly spinously tubercled.

25. LOPHOLEPIS. Decne.

An annual tufted erect grass. Leaves short, flat. Spikelets minute, 1-fld., jointed but persistent on the very short spreading pedicels of an elongate simple spiciform raceme, exactly like a bird's head; pedicels jointed on the rachis. Glumes 3; I incumbent, oblong, acute, strongly incurved above the base, produced above into a globese boss with a pectinate crest, and with a pectinate wing on the mesial line beyond it; II shorter, narrower, with often a dorsal pectinate wing; III flg. much shorter, hyaline, ovate, acute; palea hyaline. Lodicules quadrate. Stamens 2; anthers short, most minute. Styles short; stigmas feathery. Grain subulate, base gibbously incurved, free within the rigid glumes.

L. ornithocephala, Steud. Syn. Gram. 112; Decne in Archiv. Mus. Par. i. (1839) 147; Wall. Cat. n. 8881. Holboellia ornithocephala, Wall. in Hook. Bot. Misc. ii. 144, t. 76; Wight Cat. n. 1741; Kunth Enum. Pl. i. 171.

Southern Provinces of the DECCAN PENINSULA, Madura, Tinnevelly, &c., Koenig,

&c. CRYLON; Northern Province, Trimen.

A rather stiff grass, 6-18 in. high; roots wiry. Leaves \(\frac{1}{2}\)-1\(\frac{1}{4}\) in., ovate to oblonglance olate, acuminate, margins ciliolate; lower sheaths short; ligule 0. Racemes 2-4 in., columnar, \(\frac{1}{4}\) in. diam.; rachis slender, strict, and the horizontal rather stout grooved pedicels green and scabridly ciliate. Spikelets \(\frac{1}{46}\)-\(\frac{1}{4}\)\(\frac{1}{4}\) in. long, red-brown in age, horizontal or slightly deflexed from the pedicel.—One of the most singular Indian grasses.

26. PEROTIS, Ait.

A slender grass, with short broad leaves and a crinite spike. Spikelets subsessile, 1-fld., jointed on a slender simple unjointed rachis, very narrow, callus conical. Glumes 3; I and II empty, subequal, narrowly linear, 1-nerved, tapering into long capillary awns; III very minute, fig.; palea hyaline. Lodicules short, hyaline. Stamens 3, anthers very short. Styles very short, united at the base, stigmas very short. Grain much longer than its glumes, narrow.

P. latifolia. Ait. Hort. Kew, i. 85; Beauv. Agrost. t. 4, f. 9; 6 (laxifolia), Kunth Revis. Gram. i. 357, t. 92, Enum. Pl. i. 471, Suppl. 380; Steud. Syn. Gram. 186; Roxb. Fl. Ind. i. 239; Wall. Cat. n. 3783; Wight Cat. n. 1740; Grah. Cat. Bomb. Pl. 237; Dalz. & Gibs. Bomb. Fl. 296; Thw. Enum. Pl. Zeyl. 369; Trim. Cat. Ceyl. Pl. 106; Duthie Grass. N.W. Ind. 13; Benth. Fl. Hongk. 418; Miq. Fl. Ind. Bat. iii. 479. P. Burmanni, Steud. Nom. Ed. I. 605. P. cubana, Wright in Sauv. Fl. Cub. 202. P. glabrata, Steud. Syn. Gram. 186. P. hordeiformis, Nees ex Steud. Nom. Ed. II. ii. 306; Syn. Gram. l. c.; Trin. in Mem. Acad. Petersb. Ser. VI. vi. II. (1845) 267. P. longiflora, Nees in Hook. & Arn. Bot. Beech. Voy. 247; Steud. Syn. Gram. 186. P. patula, Nees ex Steud. Nom. l. c.; Trin. Fund. Agrost. ii. 266; Steud. Syn. Gram. 186. P. rara, Br. Prodr. 172; Benth. Fl. Austral. vii. 509. P. scabra, Willd. ex Trin. Diss. ii. 172. P. spicæformis, Beauv. ex Steud. Nom. Ed. I. 605. Perostis laxifolia, Beauv. l. c. 6. Saccharum spicatum, Linn. Sp. Pl. 54. S. brevifolium, Herb. Ham. ex Wall. l. c. B. Agrostis spicæformis, Linn. f., Suppl. 108; Willd. Sp. Pl. i. 362. Anthoxanthum indicum, Linn. Sp. Pl. 28. Xystidium barbatum, Presl Rel. Hænk. i. 228. X maritimum, Trin. Fund. Agrost. 102, t. 2.—Rheede Hort. Mal. xii. t. 62.

LOWER HIMALAYA, ascending to 5000 ft., from Kunawur to Sikkim. Plains of India from the Panjab to Burma and the Malay Peninsula and southwards to

CEYLON .- DISTRIB. Affghan., Trop. Asia, and Africa.

Stems stout and branching at the base, then ascending, 3-10 in., leafy. Leaves \(\frac{1}{2}\)-1 in., ovate or lanceolate, base cordate; sheath short; ligule ciliate. Spikes 1-8 in. Spikelets \(\frac{1}{10}\)-\frac{1}{2} in., contracted into a callus above the joint. Glumes scaberulous; awn very variable in length.—Bentam is, I think, right in his suggestion that P. rasa, Br., is not different from P. latifolia, and that there is but one species of Perotis, varying greatly in the size of all its parts.

27. ZOYSIA, Willd.

A small; much branched, rigid, glabrous grass. Leaves subulate, pungent. Spikelets small, ovoid, 1-fld., spicate, subimbricate, jointed on and appressed to a rigid notched unjointed rachis, sessile or shortly pedicelled. Glumes 2; I empty, coriaceous, laterally compressed, shining, nerveless, margins connate below, hyaline; II much smaller, membranous, linear-oblong, obtuse, complicate; palea short, nerveless, hyaline or 0. Lodicules 0. Stamens 3, anthers long. Styles very long, distinct, stigmas elongate. Grain free within the glumes.

Z. pungens, Willd. in Ges. Naturf. Fr. N. Schr. iii. (1801) 441; Br. Prodr. x. 208; Kunth Enum. Pl. i. 471, Suppl. 381; Beauv. Agrost. i. t. 4; f. 1; Steud. Syn. Gram. 414; Wall. Cat. n. 3763; Wight Cat. n. 1728; Thw. Enum. Pl. Zeyl. 370; Trim. Cat. Ceyl. Pl. 106; Miq. Fl. Ind. Bat. iii. 478; Hook. f. Fl. New Zeal. i. 312; Benth. Fl. Austral. vii. 506; Buchanan Grasses, N. Zeal. t. 13 A.; Baker Fl. Maurit. 442. Z. aristata, Brownii, Griffithiana, & sedoides, C. Muell. in Bot. Zeit. xiii. (1855) 272, 273, 274. Z. japonica, Wendl. ex Steud. l. c. 414. Z. sinica, Hance in Journ. Bot. vii. (1869) 168, & in Journ. Linn. Soc. xiii. (1873) 134. Z. setaces, Nees ex Steud. Nom. Ed. II. ii. 801. Z. tenuifolia, Trin. in Mem. Acad. Petersb. Ser. VI. iv. Sc. Nat. ii. (1836) 96. Matrella juncea, Pers. Syn. i. 78. Panicum Crinum-ursi, Bory ex Steud. Nom. l. c. 255. Milium maritimum, Koen. ex Wall. l. c. Ophiurus erectus, Herb. Wight. ex Wall. l. c. B. Agrostis Matrella, Linn. Mant. ii. 185; Roxb. Fl. Ind. i. 317.

Sandy shores of India, Malacca, and Ceylon.—Distrib. Trop. Asia, Austral., and Maurit.

Rootstock rigid, wiry; branches interlaced and rooting, sending up short leafy stems, 6-10 in. high. Leaves 1-3 in., corisceous, usually spreading, margins incurved; sheath short, mouth ciliate. Spikes 1-13 in. Spikelets 1-3 in.

Tribe IV. Andropogonez. (See p. 3.)

28. COIX, Linn.

A tall annual or perennial grass. Leaves long, broad. Spikes numerous, axillary and terminal; lower spikelets solitary, fem., enclosed in an at length hardened polished nut-like bract, through the apex of which the pedicelled male portion protrudes. Male spikelets 2-3-nate at each node of the rachis, one sessile and one or two pedicelled, lanceolate; glumes 4, I and II subequal, empty, rigid, or herbaceous; I keeled along the inflexed margins; III and IV hyaline, paleate, triandrous or empty. Fem. spikelets ovoid, acuminate; glumes 4, I chartaceous; II-IV successively

thinner; IV paleate. Staminodes minute. Lodicules 0. Ovary ovoid, styles 2, free slender. Grain orbicular, ventrally furrowed, enclosed in the hardened globose ovoid or cylindric involucre.

G. Lachryma-Jobi, Linn. Sp. Pl. 972; C. Lachryma, Linn. Syst. Ed. x. 1261; Lamk. Ill. t. 750; Kunth Enum. Pl. i. 20, Suppl. 16, t. 3, 4; Beauv. Agrost. t. 24, f. 5; Bot. Mag. t. 2479; Steud. Syn. Gram. 9; Webb. Phyt. Canar. t. 242, 243; Rowb. Fl. Ind. iii. 568; Grah. Cat. Bomb. Pl. 240; Wall. Cat. n. 8623; Griff. Notul. iii. 10; Thw. Enum. Pl. Zeyl. 375; Trimen Cat. Ceyl. Pl. 106; Dalz. & Gibs. Bomb. Fl. 289; Aitchis. Cat. Panjab. Pl. 157; Duthie Grass. N.W. Ind. 11, Fodd. Grass. N. Ind. 18; Miq. Fl. Ind. Bat. iii. 476, t. 41 B. C. agrentis, Lour. Fl. Cochinch. 551. C. arundinacea, Lumk. Encycl. iii. 422. C. exaltata, Jacq. Eclog. Gram. 6, t. 40. C. ovata, Stokes Bot. Mat. Med. iv. 342. C. pendula, Salisb. Prodr. 28. C. puellarum, Balans. in Journ. de Bot. iv. (Paris, 1890), 77. C. stigmatosa, Koch & Bouchè, Ind. Sem. Hort. Berol. (1855) 9. Lithagrostis Lacryma-Jobi, Gærtn. Fruct. i. 7, t. i. f. 10.

Throughout the hotter and damper parts of INDIA, wild or cultivated (not wild

in Ceylon. — DISTRIB. Trop. Asia, cult. in Africa and America.

Stem 8-5 ft., stout, leafy, rooting at the lower nodes. Leaves 4-1:

Stem 3-5 ft., stout, leafy, rooting at the lower nodes. Leaves 4-18 by 1-2 in., wavy, base cordate; sheaths smooth; ligule very short, glabrous. Spikes 2-3 in., subcrect, peduncled; male spike ets 3, or 2 with an imperfect one, \(\frac{1}{2}\) in. long; gl. I narrowly winged. Fruit ovoid or spherical, \(\frac{1}{2}\)-\frac{1}{2} in. long, osseous, bluish gray.

VAL. gigantea, Stapf mss.; perennial, attaining 15 ft. high, leaves narrower more strict, male spikelets 3-nate at the internodes, often forming long cylindric drooping spikes, gl. I broadly winged, fruit as in the type. C. gigantea, Rosh. Fl. Ind. iii. 569; Wall. Cat. n. 8624, 8625. Aitch. Cat. Panjub. Pl. 157; Duthie Grass. N.W. Ind. 11; Fodd. Grass. N. Ind. 18. C. lingulata, Hack. is Estr. Bot. Zeitschr. (1891) 5.—Rheede Hort. Mal. xii. t. 70.—Hot valleys from the N.W. Provinces to Assam and southwards to the Malay Peninsula and Travancore.—Affghanistan.

VAR. stenocarpa, Stapf mas.; fruit subcylindric 1 in. long white osseous. C. stenocarpa, Balams. l. c. C. tubulosa, Hack. in Engl. Bot. Jahrb. iii. 260?—Upper Assam, Bruce. Mergui, Griffith. Karen Hills, Wallich.—Tonkin, N.

Guines.

VAR. Ma-yuen, Stapf mss.; annual, fruit crustaceous or chartsceous. C. Ma-yuen, Roman. in Bull. Soc. Acclim. Paris. Ser. 3, viii. (1881) 442. Sikkim and the Khasia hills, ascending to 5000 ft. (cult.). Burma, Watt.—Cochinchina, Borneo, Ina. Philipp.

DOUBTFUL SPECIES.

C. AQUATICA, Rosb. Fl. Ind. iii. 571; floating and creeping from 50-100 ft., leaves linear most acute, margins hispid, male spikes drooping many-fld., flowers 3-fold, middle one pedicelled fem., corolla 6-7-valved, seeds turbinate." "Floating in margins of lakes in Lower Bengal," Rosb. This species is unknown to me and to the officers of the Calcutta Bot. Gardens.

29. POLYTOCA, Br.

Tall branching grasses; nodes bearded; fig. branches fascicled, spathaceous. Leaves long, flat. Spikes solitary or panieled, bisexual and fem. below, or the upper male only, rachis jointed; spikelets geminate, a sessile and a pedicelled. Male spikelets lanceolate, 2-fld.; gla. 4, I many-nerved, 2 keeled; II 5-7-nerved; III and IV hyaline, paleate, triandrous; anthers very long. Lodicules cuneate. Fem. spikelets imbricate, the pedicelled imperfect, its pedicel confluent with the rachis; gls. of sessile spikelet 4, I oblong, coriaceous, margins inflexed

embracing the rachis, at length crustaceous; II thin, acuminate; III hyaline, epaleate; IV hyaline, paleate, fertile. Stuminodes and lodicules 0. Ovary minute; styles long, stigmas slender. Grain very small, orbicular, enclosed in the hardened outer gls.—Species 8, tropical Asiatic and Australian.

- Infl. mostly compound; male spikelets terminal, superposed, hairy; fem. 3-7. Pedicelled fem. spikelets of one bract-like gl. terminating the joint of the rachis.—Spathes always tightly closed.
- 1. P. bracteata, Br. in Bennett Pl. Rav. Jav. 20, t. 5; male spikes rather stiff, pedicelled spikelets mostly (nearly all) rudimentary and adnate to the rachis. Steud. Syn. Gram. Coix heteroclita, Roxb. Fl. Ind. III. 572: Wall. Cat. n. 8627.

SIERIM TERAI, Assam and the Khasia Hills, ascending to 5000 ft. Burma,

on the Shan hills, Collett.-DISTRIB. Tonkin.

Stem 8-5 ft., stout or slender; sheaths and leaves glabrous, or hirsute with tubercled-based hairs. Leaves 1\frac{1}{2}-2\ tt. by \frac{1}{2}-1\ in., margins rough, base contracted. Inflorescence 3-6\ in., usually long-pedicelled and digitate; lower branches spreading or deflexed; rachis hairy. Male spikelets \frac{1}{2}\ in., glabrous or pubescent; fem. spikelets lets less than \frac{1}{2}\ in., pale, shining; rudimentary pedicelled spikelets lanceolate. \frac{1}{2}-1\ in. long, at length spreading; gl. I oblong, obtuse or emarginate, 2-keeled.

2. P. Wallichiana, Benth. in Journ. Linn. Soc. xix. (1881) 52; male spikes slender flexuous, pedicelled spikelets free. Cyathorhachis Wallichiana, Nees ex Steud. Syn. Gram. 408.—Gen. Nov. Wall. Cat. n. 8629.

BURMA; Prome and Tenasserim, Wallich; Pegu, M'Lelland, &c.; Tenasserim,

Wallich, Helfers.

- Stem leaves and sheaths glabrous or hispid with tubercle-based bristles. Leaves 2-3 ft. by 1-1½ in., lower narrowed from the middle to the base. Terminal inft. often long peduceled, branches 2-2½ in.; lateral more or less enclosed in the spathe; rachis hairy. Male spikelets ½ in.; fem. as long, pale, shining; rudimentary pedicelled spikelets ½ in., lanceolate, at length spreading.
- ** Terminal infl. only compound; male not spathaceous, fem. spathaceous, spathe at length expanded, lateral of simple spikes. Pedicelled fem. spikelets of 2 gls., pedicels adnate to the rachis.
- 3. P. Cookii, Stapf in Hook. Ic. Pl. t. 2333; male infl. very fragile, spikes 2-3 in., pedicelled spikelets free, fem. spikelets glabrous, gl. 1 3-lobulate at the tip.

N. CANARA and the CONCAN, Jacquemont, &c.

Annual. Stem 8 ft. and leaves more or less hispid with tubercle-based hairs. Leaves 14-2 ft. by 2-3 in., margins thickened. Male infl. often long-peduncled, rachis villous; spikelets \(\frac{1}{2}\) in. Fem. spikes 1 in. long; spathe 1-1\(\frac{1}{2}\) by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., at length open above; rachis glabrous; spikelets \(\frac{1}{2}\) in.; rudimentary gl. like I and II of male, but smaller.

- ** All infle. of simple bisexual spikes; spikelets glabrous.
- 4. P. semiteres, Benth. in Gen. Plant. iii. 1113. Spathes 1-1\frac{1}{2} in. always closed, fem. spikelets 2 or more. Chionachne Wightii, Munro ex Benth. in Gen. Plant. l. c. Tripsacum? semiteres, Wall. Cat. n. 8628.

The DECCAN PENINSULA; Palameotta, Wight. BURMA; Taong-dong hills, Wallish.

Rootstock creeping; stems 2-2\frac{1}{2} ft., stiff, glabrous. Leaves 8-10 by \frac{1}{2} in., rigid, tip setaceous, margins thickened; sheaths glabrous or hairy. Spaths 1-1\frac{1}{2} in. Spites 1\frac{1}{2}-3 in., male part stout, rachis glabrous; spikelets \frac{1}{2}-\frac{1}{2} in. glabrous;

pedicelled spikelets adnate to the rachis; fem. spikelets rather longer, gl. of pedicelled O er minute.

5. P. barbata, Stapf mss.; branches of infl. many umbelled, spathes in. at length open, fem. spikelets solitary, margins of gl. I keeled tip entire. C. arundinacea, Koen. ex Willd. Sp. Pl. iv. 203 (non Lamk.). Coix barbata, Roxb. Fl. Ind. iii. 569; Wall. Cat. n. 8626; Dalz. & Gibs. Bomb. Fl. 289. C. crypsoides, C. Muell. in Bot. Zeit. xix. (1861) 334. C. gigantea, Herb. Russ. ex Wall. Cat. l. c. C. Koenigii, Spreng Syst. i. 228; Thw. Enum. Pl. Zeyl. 357. Chionachne barbata, Br. in Benn. Pl. Rar. Jav. 18; Trim. Cat. Ceyl. Pl. 106; Aitchis. Cat. Panjab. Pl. 157; Duthie Grass. N.W. Ind. 11, Fodd. Grass. N. Ind. 19. Ch. Koenigii, Tkw. Enum. Pl. Zeyl. 369.

Hot and damp parts of India, from the Panjab to Assam and Munnepore, and southward to CEYLON.—DISTRIB. Java.

Stems 3-5 ft., glabrous or with the leaves and sheaths bristly with tubercle-based hairs: Leaves 1-2 ft. by \(\frac{1}{4}-\frac{3}{4}\) in., finely acuminate, margin thickened. Spikes 1-1\(\frac{1}{4}\) in., rachis usually glabrous. Male spikelets \(\frac{1}{4}\) in., glabrous or softly pilose, keels ciliolate; fem. \(\frac{1}{4}\) in., glabrous, pale; gl. of pedicelled minuto or 0.

6. P. punctata, Stapf mss.; branches of infl. few unequal, terminal subumbellate, outer spathes long green, gl. I of fem. spikelets constricted in the middle, then suddenly dilated into an ovoid obtuse claw, keels broad. Sclerachne punctata, Br. in Benn. Pl. Rar. Jav. 15, t. 4. Chionachne Massii, Balans. in Journ. de Bot. (Paris, 1890), 78. Coix sulcata, Herb. Rottl.

The DECCAN PENINSULA, Rottler .- DISTRIB. Java, Tonkin?

Stem slender, branched, glabrous, and leaves glabrous or sparsely hairy. Leaves 6-8 by \(\frac{1}{2}\) in., linear-lanceolate, flaccid. Spathes of lower outer branches long, lanceolate. Spikes \(\frac{1}{2}\) in.; male spikelets one pair, \(\frac{1}{6}\) in., glabrous; fem. \(\frac{1}{2}\) in., pale; gl. of pedicelled minute.

29*. ZEA, Linn.

A tall stout annual monoecious grass. Leaves broad, flat. Spikelets unisexual, males in terminal racemed spikes; fem. in solitary axillary stout sheathed spikes, rachis thick, inarticulate, spongy. Male spikelets 2-fld., 2-nate, a sessile and a pedicelled at each of the alternating teeth of the inarticulate rachis; glumes 4, acute; I and II subequal, membranous, empty; I enclosing the hyaline paleate III and IV. Lodicules fleshy. Stamens 3, anthers linear. Fem. spikelets 1-fld., sessile, densely crowded in many vertical series on the thick cylindric rachis; glumes 4, membranous, I and II very broad, obtuse or emarginate; III hyaline, paleate, empty; IV hyaline, often 2-fld. Lodicules 0. Ovary obliquely ovoid, plano-convex; style very long, 2-fld, arms papillose. Grain large, subglobose or flattened, surrounded by the marcescent gls.

Z. Mays, Linn. Sp. Pl. 971; Beauv. Agrost. 136, t. 24, f. 3; Kunth Enum. Pl. i. 19, Suppl. 15; T. Nees Gen. Fl. Germ. Monocot. i. n. 3, 4. Bonafous Hist. Nat. Mays (Paris, 1836), t. 1-19; Doell in Mart. Fl. Bras. ii. II, 30, t. 11; Roxb. Fl. Ind. iii. 349; Grah. Cat. Bomb. Pl. 240; Duthie Field & Gard. Crops. 25, t. 5; Miq. Fl. Ind. Bat. iii. 477. Z. alba, americana & vulgaris, Mill. Gard. Dict. Ed. viii. n. 1, 2, 3. Z. segetalis, Salisb. Prodr. 28. Mays zea, Gærtn. Fruct. i. 6, t. i. f. 9.

Cultivated throughout the hotter parts of INDIA.—Native of Peru.

30. DIMERIA, Br.

Slender annual or perennial grasses. Leaves narrow. Spikelets 1-fil., unilateral on a single terminal spike or several racemed spikes, sessile or pedicelled, rachis inarticulate. Glumes 4, I linear, rigid; II broader compressed; III smaller, hyaline, empty; IV hyaline, bisexual, entire or 2-lobed, keeled, 1-nerved, usually awned; awn terminal or in the sinus, capillary, twisted at or below the middle. Lodicules minute or 0. Stamens 2, filaments short; anthers small. Styles distinct, stigmas short. Grain linear, laterally compressed, free.—Species 12 or 14, tropical Asiatic and Australian;—all want revision with more copious material.

- .* Spike solitary; spikelets conniving; gl. I erect, II not appressed to the rachis of the spike.
- 1. **D. pusilla,** Thw. Enum. Pl. Zeyl. 369; stem filiform, leaves short, rachis very slender compressed-trigonous, spikelets $\frac{1}{8} \frac{1}{8}$ in. long sessile or pedicelled, gl. II acuminate awned. Hack. Monogr. Androp. 78; Trim. Cat. Ceyl. Pl. 107.

The Decoan Peninsula and Ceylon (CP. 957.)

Very variable, 6-18 in. high.—Amongst the many forms the following appear the most distinct. I cannot satisfactorily identify them with Hackel's descriptions.

D. pusilla, proper; stems 6-8 in. filiform, rachis of spike filiform trigonous smooth or scaberulous on the angles, spikelets pedicelled, pedicel usually naked below villous upwards. D. pusilla, Thu. l.o. ? Hack. Monog. Androp. 78. Ceylon; at Kokotodus, Gardner (CP. 957 in part).—This and the following I have described from Thwaites' type specimens.

from Thwaites' type specimens.

Var. pallida, Thw. mss.; stem as in D. pusilla proper, spikelets all sessile, or the lowest on the spike pedicelled, awn of gl. I shorter. ?D. Thwaitesii, Hack.

l. c.—Ceylon at Damboul, Thwaites (CP. 3935).

Var. elatior; stem 12 in., stouter, somewhat branched, spike longer, rachis as broad as the shortly pedicelled spikelets keeled down the centre margins scaberulous, awn of gl. I sometimes as long as the gl.—Ceylon; at Trincomalee; Glenie (CP. 957).

957).

Var. Lawsoni, stem short leafy, spike inclined, rachis broader than the sessile villous spikelets, margins ciliate, glume II shortly awned.—Malabar; Wynaad,

Lawson.

2. D. Kurzii, stem 10-18 in. erect, rachis of spike rather broader than the sessile spikelets strongly ciliate, gl. II acute not awned, more or less ciliate.

BURMA, Kurz (n. 2741); Mergui, Griffith.

Much stouter than any form of D. pusilla, which the spike closely resembles; but the spikes are longer, $\frac{1}{2}$ -2 in.; spikelets $\frac{1}{10}$ in. long.—The spikes are sometimes inclined or recurved as in the species with several on the peduncle, hence two spikes may occur. Kurz's specimens are very slender, 12-18 in. long; Griffiths' solitary one is in a very young state, with broader leaves sheathing the spike.

- ** Spikes 2-3; erect spreading or involute; gl. I erect or spreading; II usually closely appressed to the rachis.
 - + Rachis capillary.
- 3, D. Hohenackeri, Hochst. ex Miq. in Verh. Ned. Inst. III. iv. (1851) 35, stem capillary, spikes very slender, rachis filiform trigonous, spikelsts distant narrow pedicelled, gl. II acuminate dorsally ciliate. Hack. Monog. Androp. 79; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891), 189.

Psilostachys Hohenackeri, Steud. Syn. Gram. 413; Hochst. in Flora (1856), 90.

N. CANARA and MANGALORE, in rice fields, Hohenacker, Talbot.

- Stem 6-8 in. Leanes short, upper sheathing. Spikes 1-11 in.; rachis with scabrid angles. Spikelets 17 in., awns twice as long; gl. I. very narrow, acuminate, nearly glabrous, at length divaricate.
- †† Rachis trigonous or linear, sometimes as broad or broader than gl. II, joints much shorter than the spikelets.
- 4. D. ornithopoda, Trin. Fund. Agrost. 167, t. 14; spikes very slender, rachis flexuous, spikelets \(\frac{1}{17} \) in sessile or subsessile, glume II linear acute dorsally ciliate. Hack. Monogr. Androp. 81. D. filiformis, Hochst. in Hohenack. Pl. Ind. Or. n. 231. D. stipesformis, Miq. Prolus. Fl. Jap. 176; Franck. & Sav. Enum. Pl. Jap. i. 187. PD. diandra, Griff. Notul. iii. 71, Ic. Pl. Asiat. t. 157, f. 2. D. peilobasis, F. Muell. Fragm. vii. 104. D. tenera, Trin. in Mom. Acad. Petersb. Ser. vi. ii. (1833), 335; Benth. Fl. Austral. vii. 523. Didactylon simplex & ramosum, Zoll. & Mor. Syst. Verz. 100. Andropogon filiformis, Roxb. Fl. Ind. i. 256; Steud. l. c. 372. A. Roxburghianus, Schult. Mant. ii. 451. A. stipesformis, Steud. l. c. 377. Psilostachys filiformis, Dalz. & Gibs. Bomb. Fl. 305.—Dimeria, Wall. Cat. n. 8839, 8840.

Throughout INDIA; from Nepal and the Khasia Hills to the Deccan, Burma and the Nicobar Islds. (not in Ceylon).—Distrib. Malay Islds., Japan, Trop. Austral.

- Annual, much branched, leafy. Leaves 1-3 in., erect; sheaths glabrous or pilose. Spikes 2, rarely 3; rachis about as broad as the spikelets, margius scaberulous, costa strong. Spikelets linear, acuminate, callus villous; gl. I slender, nearly glabrous; III short, acute; palea 0.—Hackel has 6 varieties of this species, of which more might be made.
- 5. D. Woodrowii, Stapf in Hock. Ic. Pl. t. 2312; spikes 2 circinately involute, rachis rigid glabrous, spikelets very shortly pedicelled, callus shortly bearded, gl. I and II subequal acute, III linear hyaline, IV shortly awned.

The CONCAN; Ratnagherry district, and near Goa, Woodrow.

- Annual. Stem 8-6 in. slender, leafy to the top, simple or sparingly branched; upper internode (or peduncle) with its leaf abruptly deflexed after flowering. Leaves 2-8 in., linear, acuminate, erect, strict, glabrous or sparsely hairy; ligule very short, hyaline. Spikes 2-1 in., at first erect, rachis dorsally convex, concave ventrally. Spikelets few, rather distant, suberect, divergent as the rachis incurves; gl. I glabrous or sparsely hairy; awn of IV about twice as long as its glume; pales 0.—A very peculiar species, at once recognized by the two spikelets forming together a hoop.
- 6. **D. connivens.** Hack. Monogr. Androp. 689; annual, rachis of spike nearly as broad as the spikelets ciliate, spikelets $\frac{1}{2}$ in. subsessile, callus minutely villous, gl. I very slender ciliate, II oblong-lanceolate acuminate dorsally ciliate.

CHOTA NAGPORE, alt. 2000 ft., Clarke.

Stems ascending, 6-10 in. Leaves short, erect. Spikes 1-1\frac{1}{2} in.; rachis nearly straight, costate. Spikelets erect, closely imbricating; gl. I slender, sparsely ciliate; awn twice as long as the spikelet.

7. D. Lehmanni, Hack. Monogr. Androp. 82; spikes slender spreading, rachis undulate scabrid or ciliate, spikelets sessile in long, callus very shortly bearded, gl. I and II subacute, I narrowly linear, keel ciliate,

III oblong. D. ornithopoda, Thw. Enum. 369. Ptervgostachyum Lehmanni, Noes ew Steud. Nom. Ed. II. ii. 412, Syn. Gram. 413.

CEYLON, Macrae, Walker, Thwaites.

Annual, branched, 8-10 in. high. Leaves erect, flat, acuminate.

Var. a; glabrous, rachis of spike ciliate, spikelets awned. (C.P. 952.)

Var. β ; rachis of spike scaberulous, spikelets not awned. (C.P. 955.)

8. D. pubescens, Hack. Monogr. Androp. 83; spikes stout spreading, margins of broad straight rachis ciliate, spikelets in sessile silky, gl. I and II shortly acuminate, I narrowly linear with membranous margins longer than III. D. ornithopoda, var. y, Thw. Enum. Pl. Zeyl. 869.

CEYLON, Gardner; Pasdoon Corle, Theraites (C.P. 956).

Perennial, branched from the base, glabrous to villously hairy. Racemes 2-2½ in., refer solitary and inclined; rachis flat, 1/2 in. broad or less. Spitelets densely imbricate; gl. I and II silky all over; awn twice as long as the spikelet or longer.

9. D. fuscescens, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1833) 335; spikes stout spreading, rachis undulate margins smooth or scaberulous, spikelets 1—1 in. sessile, callus minute or 0, gl. I and II acute or acuminate, I narrowly linear much longer than III, margins of II broadly membranous. Hack. Monogr. Androp. 84; Trim. Cat. Ceyl. Pl. 107; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 189. D. ornithopoda, var. \(\beta\), Thw. Enum. Pl. Zeyl. 369.—Dimeria, Wall. Cat. n. 8841.

NEPAL, Wallich. KHASIA HILLS, alt. 4-5000 ft., Griffith, &c. THASSERIM,

Helfer. The Concan, Lieboa. CEYLON, Gardner, Theoaites (C.P. 3258).

Perennial, 2-3 ft. high, stout, simple or branched. Leaves glabrous or hairy. Spikes 2-4 in.; rachis compressed trigonous. Spikelets reddish-brown; awn twice as long as the gls.—The Tenasserim specimens are small and in a poor state.

10. **D. alata,** Hook. f.; spikes 2-3 rather stout, spikelets $\frac{1}{10}$ in. sessile glabrous callus naked, gl. I scaberulous, II dimidiate-ovate keel broadly winged, III nearly as long as II, awn 0. D. ornithopoda δ mutica, Theo. (in part).

CEYLON, Thwaites (O.P. 955 of 1864).

Annual. Stems 6-18 in., tufted, slender, erect. Leaves. 6-12 by 1-1 in., erect, strict, narrowed to the base, and sheaths hirsute with long spreading hairs. Spikes 3 in., strict, spreading; rachis 10 in., stout, straight, margins scaberulous. Gl. I divaricate; II appressed to the rachis, broadly hyaline; wing opaque, strongly ciliate; III oblong, ciliate, 1-nerved; IV obovate-oblong, ciliate.—The small glabrous spikelets and broadly winged gl. II distinguish this species from D. fuecescens.

Spikes 4-10 (rarely 3) digitate or fascicled.

11. D. gracilis, Nees ex Steud. Syn. Gram. 413; leaves not contracted above the sheath, spikes 3-10 long slender flexuous quite glabrous, rachis filiform subtrigonous, spikelets 1-1 iu., pedicels long slender glabrous, callus bearded. Hack. Monogr. Androp. 88; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 190. D. laxiuscula, Thw. ex Trim. is Journ. Bot. xxiii. (1885), 272, Trim. Cat. Ceyl. Pl. 107.

The Concan, Law; on the Ghats, Lieboa. CEYLON, Macrae, Thwaitee, &c.

(C.P. 3863).

Perennial, 1-2 ft. high, stout or slender. Spikes 13-8 in., pale red-brown; gl. I and II, lanceolate, ciliate; I scabrid above the middle or all over; II with narrowly membraneus margins; awn twice as long as the spikelet.

12. D. leptorhachis, Hack. Monogr. Androp. 89; leaves contracted

above the sheath, spikes slender, rachis filiform ciliolate at the nodes, spikelets \(\frac{1}{2} \)—\(\frac{1}{2} \) in., pedicels very short thickened, callus bearded. D. pilosissima, Thw. Enum. Pl. Zeyl. 369; Trim. Cat. Ceyl. Pl. 107 (not of Trin.).

TENASSERIM, Helfer, Griffith (Kew distrib. 6799). CEXLON; on Adam's Peak (C.P. 24, 3261).

Perennial, stout. Leaves glabrous or villous. Racemes 2-6 in.; rachis straight or flexuous; internodes 1-1 in. in Tenasserim specimens, much shorter in Ceylon ones. Spikelets pale or dark, red-brown; gl. I and II acuminate, ciliate in Ceylon, acaberulous in Tenasserim; II with narrowly membranous margins.

31. IMPERATA, Cyrill.

Perennial, erect, often tall grasses. Spikelets 1-2-fld., in spiciform or thyrsiform silvery-silky panicles, binate, both pedicelled, upper fl. perfect, lower imperfect or 0. Glumes 4, membranous, awnless; I and II lanceolate, hairy; III much smaller, hyaline, glabrous; IV still smaller, hyaline, glabrous; palea hyaline, glabrous. Stamens 1-2; anthers large, linear. Styles connate at the base, stigmas linear. Grain small, oblong, free.—Species 5, tropical, chiefly American; 2 Asiatic, one also European.

1. I. arundinacea, Cyrill. Pl. Rar. Neap. Fasc. ii. 26, t. 11; panicle very narrow spiciform, branches short appressed, gl. I 5-9-nerved, stamens 2. Br. Prodr. 204; Kunth Enum. Pl. i. 477; Hack. Monogr. Androp. 92; Steud. Syn. Gram. 405; Reichb. Ic. Fl. Germ. t. 55; Boiss. Fl. Orient. v. 452; Thw. Enum. Pl. Zeyl. 369; Trim. Cat. Ceyl. Pl. 106; Duthie Grass. N.W. Ind. 14, Indig. Fodd. Grass. t. 15, Fodd. Grass. N. Ind. 22; Aitchis. Cat. Punjab. Pl. 173. I. Allang, Jungh. in Tijdschr. Nat. Gesch. vii. 295; Steud. l.c. 405 (Alang). I. condensata, Steud. l.c. 431. I. cylindrica, Beauv. Agrost. 165. I. filifolia, Nees ex Steud. l.c. I. Koenigii, Beauv. Agrost. 155; Wall. Cat. n. 8850. I. pedicellata, Steud. in Flora, xxix. (1846) 22, Syn. Gram. l.c. I. Sieberi, Opiz. Natural. x. (1825) 190. I. Sisca, Beauv. ex Steud. Nom. Ed. II. i. 805. I. Thunbergii, Nees ex Wall. Cat. n. 8851. Saccharum cylindricum, Lamk. Encycl. i. 594; Roxb. Fl. Ind. i. 234; Grah. Cat. Bomb. Pl. 239; Griff. Notul. iii. 80. S. diandrum, Koen. ez Retz. Obs. v. 16. S. europseum & S. indum, Pers. Syn. i. 103. S. Koenigii, Retz. Obs. v. 16. S. spicatum, Burm. ex Kunth l.c. S. laguroides, Pourr. in Mem. Acad. Toul. iii. (1788) 326. S. Ravennæ, Bieb. Fla Taur. Cauc. iii. 51. Lagurus cylindricus, Linn. Syst. Nat. Ed. x. 878. Calamagrostis Lagurus, Koel. Descr. Gram. 112; Host Gram. Austr. iv. t. 40.

Hotter parts of India, from the Panjab southward and eastward to Malacca and

Ceylon - DISTRIB. All warm countries.

Rootstock creeping. Stem 1-3 ft., solid, nodes glabrous or bearded. Leaves erect, often exceeding the stem. Panicle 3-8 in., silvery with dark anthers and stigmas. Spikelets 1-3 in., callus-hairs about twice as long as the gls.; gl. I rather thickened towards the base, dorselly hairy, tip obtuse; II as long as I, 3-7-nerved; III = 1-1 II. oblong, irregularly toothed, nerveless; IV ovate, acute, toothed, faintly 1-nerved or nerveless; palea about half as long as the gl., quadrate, retuse or toothed, nerveless, glabrous.—Hackel distinguishes the Indian form as var. Koesigii, having villous nodes and broader less rigid leaves, but some of the Indian specimens appear to me quite like the Western.

Var. latifolia; stem 3-4 ft. very robust, nodes glabrous, leaves long \(\frac{1}{2} - \frac{1}{2} \) in. broad, pales of gl. IV with long-ciliate lobes.—Tropical Himalays, from Kumaon to

Assam.

- 2. I. exaltata, Brongn. Voy. Coq. Bot. 101 (excl. Syn.); panicle thyrsiform, lower branches elongate, gl. I 3-5-nerved, stamen 1. Hack. Monogr. Androp. 99. I. caudata, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 331. Pl. jaculatoria, Roem. & Sch. Syst. ii. 289. I. ramosa, Anderss. in Efvers. Vet. Akad. Stockh. (1855) 158. Saccharum Alopecurus, Nees in Hook. Kew Journ. ii. (1850) 100; Steud. Syn. Gram. 406. S. caudatum, Mey. Prim. Fl. Esseg. 68. S. confertum, Presl Rel. Hænk. i. 346. S. contractum & dubium, H. B. & K. Nov. Gen. et sp. 182, 183. P. S. jaculatorium, Cour. Fl. Cochinch. 53; Poiret Encycl. Suppl. ii. 70. S. macilentum, Chauv. ex Steud. l. c. S. negrosense, Steud. l. c. Anatherum porto-ricense, Spreng. Syst. i. 290. A. caudatum, Schult. Mant. ii. 445. Syllepis polystachya, Fourn. ex Hack. in Mart. Fl. Bras. ii. III. 251.
- SINGAPORE, Cuming. BURMA; Mergui, Griffith.—DISTRIB. Malaya, N. Hebrides, Am. trop.

Stem tall, up to 7 ft., slender, fistular, glabrous, nodes glabrous. Leaves 2-3 ft. by $\frac{1}{4}$ -1 in., linear, finely acuminate, smooth, glabrous or sparsely pubescent; sheath glabrous; ligule very short. Panicle 12-18 in., 4-5 in. broad at the base, narrowly subpyramidal; rachis slender; lower branches 3-4 in. long, branchlets and pedicels ciliate. Spikelets $\frac{1}{6}$ - $\frac{1}{6}$ in., like those of I. arundinacea, but gl. I and II fewer nerved; III = $\frac{1}{2}$ II oblong, deeply irregularly toothed above the middle, glabrous, nerve very slender; IV cuspidately lanceolate from an ovate base, quite entire, glabrous; palea quadrate, many-toothed, glabrous.

32. MISCANTHUS, Anderss.

Tall perennial grasses. Spikes long, simple and branched, very slender, crowded at the top of the peduncle into a nodding fan-shaped corymb; rachis obscurely jointed. Spikelets very numerous, in unequally pedicelled pairs, 1-fid., dorsally subcompressed, one or both usually awned, callus with long silky hairs. Glumes 4; I chartaceous, nearly flat with narrow incurved margins; II similar but more convex; III hyaline, ovate, epaleate; IV hyaline, 2-fid or 2-toothed, with a long awn (rarely short or 0) in the siuus; palea minute. Lodicules cuneate. Stamens 2-3. Styles free, stigmas rather short. Grain linear-oblong, free.—Species 5-6, Asiatic and Polynesian.

⁶ 1. M. nepalensis, Hack. Monogr. Androp. 104; spikes very many densely crowded 5-7 in., hairs of callus much longer than the spikelet. Eulalia nepalensis, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 333, Sp. Gram. Ic. t. 332. Pollinia nepalensis, Benth. ex Duthie Grass. N.W. Ind. 16.—Erianthus, Wall. Cat. n. 8848.

TEMPREATE HIMALAYA; from Garwhal to Bhotan, alt. 5-7500 ft., Wallich, &c. Khasia Hills, alt. 4-5000 ft. Naga Hills, Prain.

- Stem 3-6 ft., as thick as a goose-quill in large plants. Leaves 6-18 in. by $\frac{1}{3}$ in., margins smooth, midrib stout; ligule rounded. Spikes flexuous; rachis capillary, glabrous; pedicels $\frac{1}{3}$ in. Spikelets $\frac{1}{14}$ in. long, purplish or golden yellow, shining; gl. I and II minutely 2-toothed.
- 2. M. nudipes, Hack. Monogr. Androp. 109; spikes few 2-3 in., hairs of callus not longer than the spikelet. Erianthus nudipes, Griseb. in Nachr. Akad. Wiss. Goett. (1868) 92.

SIEKIM HIMALAYA, alt. 9-12,000 ft., J. D. H. UPPER ASSAM; Mishini Hills, Griffith.

Much smaller than M. sepalensis, 2-3 ft. high, with leaves 4-10 in. long, the margins of which are smooth as in that plant; spikelets very much longer, \(\frac{1}{2}\)-\(\frac{1}{2}\) in. long, and narrower.

33. SPODIOPOGOM, Trin.

Tall grasses. Leaves often long-petioled. Spikelets 1-2-fid., panicled, laterally compressed or subterete, 2-3-nate, lower sessile male, upper bisexual, rachis jointed. Glumes 4; I and II subequal; I lanceolate, 5-9-nerved, tip acuminate or toothed; II membranous, lanceolate, 3-7-nerved; III hyaline, paleate or not, 3-androus or empty; IV 2-fid or 2-partite with a very slender exserted awn in the sinus; palea shorter. Lodicules cuneate. Anthers linear. Stigmas linear. Grain free, narrowly fusiform.—Species, about 5. Asiatic.

1. **S. albidus,** Benth. in Journ. Linn. Soc. xix. (1881) 66; decumbent, leaves long-petioled broad flaccid, panicle narrow, spikelets 2-fld. laterally compressed, silkily villous, gl. I membranous. Hack. Monogr. Androp. 185. Andropogon albidus, Hb. Heyne. A. rhizophorus, Stoud. Syn. Gram. 381; Duthie Fodd. Grass. N. Ind. 26.—Andropogon? Wall. Cat. n. 8821.

RAJPOOTANA; on Mt. Aboo, Duthie. DECCAN PENINSULA, from the Concan to Travancore.

A weak struggling tufted branched annual?, 2-4 feet; stem very alender, much branched, leafy. Leaves 6-10 by \(\frac{1}{2}\) in., flaccid, linear-lanceolate, acuminate, 1-nerved, usually suddenly narrowed into a slender petiole 1-3 in. long; sheath 3-5 in.; ligule oblong, glabrous. Panicle at first enclosed in a long narrow spathaceous leaf-sheath; rachis compressed, ciliate. Spikelets about \(\frac{1}{2}\) in. long, white; shortly pedicelled. Gl. I minutely 2-mucronate, 7-nerved; II broader, much compressed; III truncate tip erose.

2. S. dubius, Hack. Monogr. Androp. 186; erect, leaves sessile long narrow and sheaths softly hairy, paniele narrow, spikelets 1-fid. silkily villous, gl. I chartaceous 7-9-nerved.—Andropogon, n. 16, Herb. H. f. & T.

TEMPERATE HIMALAYA; from Kashmir to Garwhal, alt. 6-8000 ft., Thomson, &c.

Perennial. Stem 2-4 ft., solid, as thick as a goose-quill, quite smooth. Leaves 12-18 by 4-4 in., smooth hairy or villous, bese villous, margins scaberulous, base villous, midrib broad, white; sheath glabrous; ligule densely villous. Panicle 6-8 in., narrowly oblong, erect, very dense-fid., pale; pedicels very short. Spikelets 4 in.; gl. I acuminate, dorsally convex, margins narrowly incurved; II as long, subchartaceous, 3-5-nerved, hairy dorsally, sometimes obtuse and apiculate; III oblong, obtuse, hysline, 1-nerved ciliate; IV shorter than II, cleft into lanceolate segments with a slender interposed awn as long as the spikelet, 3-nerved below the middle; pales lanceolate, 2-fid.

3. S. cotulifer, Hack. Monogr. Androp. 187; tall, erect, leaves long sessile and petioled, panicle lax effuse branches and long capillary pedicels short subclavate, spikelets 1-fid. lanceolate terete sparsely hairy, gl. I and II coriaceous strongly nerved. Eulalia cotulifera, Munro ex Miq. Prolus. Fl. Jap. 177; Franch. & Sav. En. Pl. Jap. ii. 189. Miscanthus cotulifer, Benth. in Journ. Linn. Soc. xix. (1881) 65. Eccoilopus andropogonoides, Steud. Syn. Gram. 124. Andropogon cotulifer, Thunb. Fl. Jap. 41.

WESTERN TEMPERATE HIMALAYA, alt.

Garwhal, Jacquemont, Duthie. KHASIA HILLS, alt. 3-4000 ft., J. D. H. & T. T .-

DISTRIB. China, Japan.

Perennial. Stem 3-8 ft. or more from a woody branched stock, as thick as a swan's quill or less. Leaves 2-3 ft. by \(\frac{1}{2} \) in:; sheath long, grooved; ligule short. Passels 6-12 in., rachis slender, terete, branches whorled, capillary, lower 1-3 in., lax-fid., flowering towards the ends; pedicels \(\frac{1}{10} \) \(\frac{1}{10} \) in., clavellate, tips cupped. Spikelets \(\frac{1}{2} \) in., green; tail callus bearded; gl. I and II very strongly 7-9-nerved, nerves scaberulous, tips 2-dentate and very shortly awned; III oblong, tip rounded, scaberulous above the middle, not ciliate; palea lanceolate, subciliate; IV glabrous, cleft to below the middle into setiform lobes, awn twice as long as the spikelet; palea large, broadly ovate, obtuse, ciliate, nerveless.—A peculiar grass very unlike the other species.

34. POLLIMIA, Trin.

Annual or perennial grasses. Spikes subdigitately approximate or fascicled, hirsute silky or ciliate, rachis fragile. Spikelets binate a sessile and pedicelled rarely both pedicelled, 1-fid. or the sessile 2-fid. Glumes 4, I membranous or coriaceous, dorsally flattened or concave, truncate often narrowly, or tip 2-toothed, margins narrowly inflexed throughout its length; II as long, usually laterally compressed, keeled, acute, rarely awned; III hyaline, ciliate, rarely neuter or male, paleate (sometimes represented by a gl.-like palea); IV very short, hyaline, entire 2-fid or 2-auricled or reduced to a dilated base of the long twisted exserted awn; palea small or 0. Lodicules obliquely truncate. Stamens 3, rarely 2. Stigmas long. Grain free.—Species about 30, tropical and subtropical of the Old World.

The characters by which Pollinia is distinguished from Ischamum are very unsatisfactory. The colour of the hairs of the spikes in Sect. Eulalia cannot be altogether depended upon; nor can the sexuality of the spikelets and presence or absence of gl. III be in Sect. Leptatherum. The apparent replacement of gl. III in some species by a palea as long as gl. I and concave towards it, first observed and commented on by Hackel (Androp. 171) is a very curious departure from the normal condition of the spikelet in Antropogonea. It is not confined to Pollinia.

- Sect. I. Stem erect. Leaves not conspicuously constricted or petioled above the sheath. Gl. I as long as II, narrowly truncate; II not broadly truncate; III or its pales present.
 - Glume II of sessile spikelets awned. Basal sheaths of stem naked.
- 1. P. articulata, Trin. in Bull. Sc. Acad. Petersb. (1836) 71; annual, very slender, leaves usually filiform, spikes usually very many, hairs of rachis white, spikelets $\frac{1}{12} \frac{1}{12}$ in. brown, gl. I narrowly truncate, keels villous below with white hairs, II glabrous except the margins, III (? palea of gl. IV) ovate obtuse, IV narrowly oblong 2-fid or 2-toothed, &wn very long ciliate, palea short broad. Hack. Monogr. Androp. 153; Benth. Fl. Hongk. vii. 525. P. setifolia, Nees in Hook. Kew Journ. ii. (1850) 101. Pogonatherum contortum, Brongs. Bot. Voy. Coq. 90, t. 17. Erianthus articulatus, F. Muell. Fragm. Phyt. Austral. viii. 118. Eulslia concinna, Nees ex Steud. Syn. Gram. 412. Andropogon koretrostachys, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 273. A. brunneus, Heyne in Herb. Rottler. A. asthenostachys, Steud. l. c. 381.—Andropogon, Wall. Cat. n. 8813, 8814.

Plains of lower Gangetic Valley and Behar, ascending to 3000 ft. Sikkim and Khasia Hills. Chota Nagpur, Gamble. Nilghiri Hills; the Wynaad, Heyne.

BURMA, Wallich .- DISTRIB, Mulaya, China, Australia.

Stem 1-2 ft., erect, tufted, nodes glabrous. Leaves 6-18 in., erect, flexuous, \(\frac{1}{1-\frac{1}{10}} \) in. broad (except in Wallich's n. 8813), glabrous. Peduncle filiform. Spikes \(\frac{1}{2}-2 \) in., fascicled, very slender, erect. Spikelets amongst the smallest of the genus; gl. IV very variable in length and in depth of lobing, sometimes subentire, awn sometimes 1 in. long.—Hackel has two subspecies, one with the nodes of the spike longer and not disarticulating, which includes the Burmese plant of Wallich, n. 8814, and the Sikkim plant; the other has fragile spikes with much shorter nodes, to which Wallich's Burmese, n. 8813 belongs; this latter is a much taller stouter plant with leaves \(\frac{1}{4} \) in. broad and stems thicker than a crow-quill.—What Hackel describes as gl. III appears to me to be the pales of gl. IV, for it surrounds the overy.

Var. β, pedicellata, Hack. mss.; both spikelets long pedicelled. Kumaor,

Duthie.

2. **P. pallens**, Hack. Monogr. Androp. 156; leaves very slender, spikes 5-10 silkily hairy white, rachis slender, spikelets in., gl. I narrow membranous bicuspidate shortly villous, II laxly villous, III oblong obtuse ciliate, IV narrow 2-fid, awn 2-3 times as long as the spikelet.

KHASIA HILLS, alt. 5000 ft., Griffith, &c .- DISTRIB. China.

Stem 2-3 ft., slender; nodes glabrous. Leares 12-20 by $\frac{1}{10-1}$ in., hairy beneath, margins revolute, tips filiform. Spikes 2-4 in., slender, silkily hairy. Spikelets narrowly lanceolate. Gl. I 2-nerved; II with the capillary awn very variable in length, keel and margins ciliate; III oblong, obtuse, ciliate; IV ciliate, oblanceolate, adnate portion of awn forked about half-way down; palea broadly ovate or orbicular, entire, not ciliate.

- ** Glume II of sessile spikelet not awned.
- + Basal sheaths of stem naked.
- § Spikelets 1-1 in.
- 3. P. quadrinervis, Hack. Monogr. Androp. 158; spikes 3-6 and pedicels villous with long silvery-grey hairs, spikelets \(\frac{1}{2-1}\) in. oblong-lanceolate subacute, gl. I dorsally concave 4-nerved (often obscurely), III glabrous, IV short broadly deeply obcordate, awn 3-4 times as long as the spikelet, palea short broad. P. villosa, Munro in Benth. Fl. Hongkong, 420 (non Spreng.). Erianthus tristachyus, Nees in Hook. & Arn. Bot. Beech. Voy. 241; et in Pl. Meyer. 183 (excl. Syn.).—Andropogon, Wall. Cat. n. 8808.

SUBTROPICAL HIMALAYA; from Simla to Sikkim, the MISHMI, and KHASIA HILLS, alt. 3-5000 ft., Clarke. Pegu, alt. 4-6000 ft., Kurs.—Distrib. China.

Stem 1-2 ft., leafy upwards, nodes glabrous. Leaves narrow, glabrous or hairy beneath, or on both surfaces, or with the sheath hirste, tips finely acuminate; ligule oblong. Spikes 3-5, 2-6 in., erect or flexuous. Spikelets pale yellow-brown; callus hairs long white; gl. I with hispid keels above, tip contracted minutely truncate, margins rather broadly inflexed; II acute, minutely apiculate, sub 3-nerved, keel smooth, margins ciliate; III linear-oblong, long-ciliate above; IV with the adnate awn forked towards the base, lobes rounded ciliolate; palea lanceolate, ciliolate.—Nees, as Hackel observes, errs in describing the base of the stem as rufous-baired. The Khasia plant has softly villous foliage and has paler spikes, and closely resembles P. speciosa, var. heterotricha.

Var. Wightis; stem tall stout silky below the panicle, leaves \(\frac{1}{2} \) in. broad acute, spikes 3-7 in., spikelets nearly \(\frac{1}{2} \) in., gl. I 2-4-nerved, IV cuneately obsvate broadly

2-lobed.—Pulney Mts., Wight. Possibly a species, differing from quadrinervis in the broad leaves which have not setaceous tips and in the broad gl. IV.

4. **P. hirtifolia**, *Hack. Monogr. Androp.* 165; spikes few, rachis and pedicels villous with long pale violet hairs, spikelets & in. linear-oblong, gl. I dorsally slightly concave obscurely 4-nerved, keels laxly villous with long hairs, gl. IV short broadly obovate-oblong 2-lobed, awn several times longer than the spikelet glabrous, palea minute.

WESTERN TEMPERATE HIMALAYA, alt. 5500-8000 ft., from Simla, Huegel, to

Kumaon, Strachey & Winterb. (n. 925).

- Stem 2-3 ft., leafy, nodes glabrous. Leares 8-18 in., very narrow, more or less hirsute beneath or on both surfaces, tips filiform; ligule very short, long-bearded. Spikes 3-8, rather distant, 3-7 in. long, joints and pedicels rather stout, hairs shorter than the pale brown spikelets; gl. I chartaceous, shining, tip entire, obtuse or truncate, keels ciliate aculcate above; II obtuse, glabrous except the ciliate margins, keel smooth; III lanceolate, ciliate, nerveless; IV ciliate 3-nerved; palea broadly ovate, glabrous.—The joints of the rachis are decidedly obliquely truncate. Very near P. quadrinervis, of which it may be a variety.
- 5. **P. Thwaitesii**, Hack. Monog. Androp. 163; stems short, leaves chiefly radical very slender subdistichous, spikes 2-3, rachis and pedicels villous with white, hairs, spikelets \(\frac{1}{6}-\frac{1}{4}\) in. lanceolate, gls. I concolorous acute 2-nerved, IV linear 2-fid lobes narrow acute, awn more than twice as long as the spikelets, palea minute. P. tristachya, var. Thw. Enum. 368; var. distachya, Trim. Cat. Ceyl. Pl. 106.

CEYLON; in swamps, alt. 7000 ft., Gardner, Thwaites.

- Stem short, lengthened downwards and nodose, above densely clothed for 1-3 in. with subdistichously imbricating leaf-sheaths, 1-2 in. long, which are produced into slender wiry erect convolute leaves 6-12 in. long; ligule minute. Spikes 2-3 in. long. Gl. I pale brown to the tip, dorsally concave, margins narrowly incurved; keels villous; II lanceolate, acute, keel hairy below scaberulous above; III linear-lanceolate, acute, convolute, obsoletely 2-nerved, tip ciliate; IV nearly as long, glabrous; palea ovate, ciliolate.
- 6. P. mollis, Hack. Monogr. Androp. 161; spikes usually many, rachis and pedicels villous with very long silvery-white hairs, spikelets \(\frac{1}{6}\rightarrow\) in narrowly lanceolate acuminate dorsally flat faintly 2-nerved, IV sarrow shortly 2-fid or 2-toothed, awn 3- or more times longer than the spikelet, palea minute. Erianthus mollis, Griseb. in Goett. Nachr. 1868, 92. Eulalia mollis, Munro mss.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5-8000 ft.

Stem 10-12 in., slender, tufted, leafy chiefly at the base. Leaves 2-3 in., narrowly lanceolate; sheath glabrous or ciliate; ligule very short, bearded. Spikes 3-10, 1-2 in. long, crowded, flexuous, joints and pecicels slender beautifully silvery-silky with very long hairs. Spikelets pale; gl. I thin, villous, hairs much longer than itself, lower half dark brown, upper pale, tip obscurely notched or 2-mucronate; II subacute, dorsally sparsely hairy, keel smooth, margins ciliate; III lanceolate, hyaline and ciliate in the upper half, 1-nerved; IV much shorter, awn very slender; palea glabrous.—Almost intermediate between Pollinia and Erianthus, Hack: l. c. 162.

§§ Spikelets 10-8 in.

7. P. argentea, Trin. in Bull. Sc. Acad. Petersb. i. (1836) 71; spikes many, rachis and pedicels villous with silvery hairs, spikelets 10 in. linear-oblong pale, gl. I dorsally flat nerveless membranous above the middle

villous or glabrate below it, IV linear 2-fid, lobes narrow acute, awn several times longer than the spikelet ciliate, pales O. Hack. Monogr. Androp. 162. P. tristachya, Thw. Enum. Pl. Zeyl. 368 (in part); Benth. Fl. Austral. vii. 527. Duthie Fodd. Grass. N.W. Ind. 26, t. 53. Eulalia argentes, Brongn. Voy. Coq. Bot. 92. Erianthus rufus, Nees ex Steud. Syn. Gram. 409 (partim). E. hexastachyus, Hochst. in Hohen. Pl. Ind. Or. n. 279; Mig. Anal. Bot. Ind ii. 35. E. Roxburghii, F. Muell. Fragm. Phyt. viii. 117. E. tristachyus, Nees in Herb. Strach. & Winterb. No. 4: in Hook. &. Arn. Bot. Beech. Voy. 241. Saccharum rufum & tristachyum (in part), Steud. l.c. 408. Andropogou minutiflorus & hexastachyus, Steud. l. c. 379, 380. A. trispicatus, Schult. Mant. ii. 452. A..tristachyus. Roxb. Fl. Ind. i. 256.—Andropogon, Wall, Cat. n. 8811.

TROPICAL HIMALAYA, alt. 1-5000 ft., from Kumaon eastwards to the Khasia' HILLS, BENGAL, BEHAR and southward to CEYLON .- DISTRIB. Malaya, Australia.

Stem 2-3 ft. high, leafy, or in small specimens leafy at the base chiefly. Leaves 12-18 in., rarely 1 in. broad, glabrous or sparsely bairy; ligule very short, bearded. Spikes 2-12, 14-6 in. long, flexuous; rachis and pedicels slender. Gl. I thin, pule brown below, pale yellow above the middle; II and III as in P. hirtifolio, but IV longer and narrower.—Roxburgh describes this as an annual delicate beautiful species, but most of the specimens appear to be perennial. The very small spikelets resemble those of P. articulata.

8. P. fimbriata, Hack. Monogr. Androp. 164; stems very slender shining, leaves very narrow, spikes 2-4 villous with white hairs, joints very short slender, spikelets 10-1 in., gl. I lanceolate truncate nerveless dorsally smooth depressed, keels ciliate, II obtuse, III oblong-lanceolate ciliate, IV narrow 2-fid, awn much longer than the spikelets ciliate, palea very minute or 0.

WESTERN HIMALAYA, Simla, alt. 7-8000 ft., Thomson. MALABAR and CONCAN,

Stocks, &c. Pegu, M'Lelland.

Annual. Stem 1 2 ft., internodes much longer than the sheaths, nodes glabrous. Leaves 6-10 by 1 in., flaccid, sparsely hairy above; sheath glabrous; liquie a ciliolate ridge. Spikes 1-8 in., long-peduncled, flexuous, pale; rachis slender, joints densely villous; gl. I with villous keels above, obscurely 2-toothed; IV with oblong ciliate lobes.—Hackel describes gl. IV. as epaleate, but I find a minute palea. He suspects that Andropouon conjugatus, Roxb. (Fl. Ind. i. 255) to be closely allied, but Roxburgh describes his plant as the smallest of the genus, with minute leaves, the two spikes as exactly paired and touching one another? which is not the case in P. fimbriata.

- †† Basal sheaths of stem villous or woolly.
- 9. P. pheothrix, Hack. Monogr. Androp. 168; basal sheaths rustytomentose, leaves very slender, spikes 2-4, spikelets 1 in., gl. I broadly or narrowly truncate nerveless or faintly 2-nerved dorsally hispidly villous, IV short deeply 2-fid segments nurrow, palea small obovate ciliate. P. Cumingii, Thw. Enum. Pl. Z.yl. 368; Trim. Cat. Ceyl. Pl. 106 (non Nees). P. argentea, Balans. in Journ. de Bot. (Paris, 1890) 81. Erianthus. aureus, Nees in Wight Cat. n. 1690 (excl. syn.); Steud. Syn. Gram. (sub Eul. nepalensis). E. Cumingii, F. Muell. Fragm, viii. 118. E. tristachyus, Nees l.c. n. 1691. Andropogon pilosus, Willd. en Wight l.c. 1690. A. brunneus, Heyne in Herb. Rottl.

NILGHIBI HILLS, alt. 6-7000 ft. Wight, &c. CEYLON, in the Central Provinces. -DISTRIB. Tonkin.

Stem 18-24 in., slender; peduncle silky under the panicle. Leaves 6-18 in.,

rarely \(\frac{1}{2}\) in. broad, acute, short and filiform in some Nilghiri specim:ns, glabrous or hairy; ligule short, bearded. Spikes 1-3 in., stout, dark brown, rather distant, joints about \(\frac{1}{2}\) as long as the spikelets. Spikelets linear-oblong; gl. I dorsally densely villous chiefly at the sides and above; II tip narrowly truncate, keel obscure hairy about the middle; III as long as I, nerveless, ciliate above the middle; IV half as long, awn stout inserted in the cleft, broadening out and vanishing.—A Tonkin specimen is \(\frac{3}{2}\) ft, with broader leaves and white hairs on the rachis.

10. P. birmanica, Hook. f.; tall, stout from a very stout rootstock with rusty-woolly basal sheath, leaves narrow glabrous, spikes few 3-6 in. strict erect, rachis stout villous, spikelets ‡ in. oblong, gl. I narrowly truncate nerveless, IV very narrow 2-fid eciliate.

BUBMA; Yomah, Kurs.

Rootstock as large as a walnut. Stem 4-5 ft., villous below the panicle; nodes pubescent. Leaves 10-18 in., smooth, glabrous. Spikes closely appressed to the rachis, villous with golden-brown hairs; joints as long as the spikelet, obliquely truncate. Spikelets dark brown; gl. I dorsally flat, sparsely villous, sides copionaly so, margins rather broadly incurved from base to apex; II narrowly oblong, obscurely keeled, sides villous; III oblong-lanceolate, hyaline, ciliate; IV very small, awn \(\frac{1}{2}\) in. long; palea orbicular-ovate, long-ciliate.—Possibly only a very large form of P. phaeothriz, with a stout rootstock, and rachis of the spikes narrower.

11. P. speciosa, Hack. Monogr. Androp. 159; tall, stout, basal sheaths clothed with pale yellow-brown wool, leaves narrow usually villously hirsute, spikes 3-5 often very long slender flexuous villous with pale yellow-brown hairs, spikelets \(\frac{1}{2}\) in. oblong, gl. I narrowly truncate faintly 4-nerved back and sides villous, IV narrowly 2-fid lobes acute eciliate, awn tortuous and twisted, palea very small suborbicular. Erianthus speciosus, Debeaux in Act. Linn. Soc. Bord. xxxii. (1878) 53.—Erianthus, No. 9, Herb. Ind. Or. Hf. & T.

KHASIA HILLS, alt. 5-8000 ft., common. NAGA HILLS, Prain.—DISTRIB. China.

Stems 3-4 ft., densely tufted, peduncle silky below the panicle. Leaves 12-18 by 1-18 in., densely villously tomentose on both surfaces in the Khasia specimens (var. heterotricha, Hack. mss.), tips filiform; ligule a long beard. Spikes 3-8 in., joints slender — the spikelet. Spikelets with sometimes parti-coloured hairs, those of the callus white or concolorous; gl. I narrowly oblong-lanceolate; II subacute, dorsally sparsely hairy, margins ciliate; III linear-oblong, ciliate; IV shorter, linear-oblong, lobes shorter than the gl.; awn several times longer than the spikelet, vanishing downwards in the gl. Lodicules 2-fid, ciliate.—The Naga Hill specimen has glabrous leaves like the Chinese. Closely resembles P. historia and narrow gl. IV. In Sampson's Chinese specimens preserved at Kew (the plant described by Hackel) the base of the stem is wanting; but in fine ones collected at Ichang by Henry, the basal sheaths are woolly, exactly as in the Khasian plant.

12. P. velutina, Hack. Monogr, Androp. 169; tall, stout, basal sheaths villous with long silky hairs, leaves narrow glabrous, spikes 3-8 long, villous with long pale yellow-brown hairs, spikelets & in. oblong, gl. I narrowly truncate 2-cuspidate 4-nerved, back and sides villous, IV narrowly 2-fid or 2-toothed eciliate, awn tortuous and twisted, pales broadly ovate shortly ciliate.

KHASTA HILLS, alt. 4-5000 ft. J. D. H & T. T., Clarks.

Except in the silky villous clothing of the basal sheaths of the stem, this bardly differs from glabrous states of P. speciosa; but whereas the leaves of speciosa are

(as far as has been observed) always hirsutely villous in the Khasia, those of voluting are always glabrous. Gl. IV varies in the breadth and depth of its lobes which are obtuse or acute.—Duthie (Grass. N.W. Ind 15) gives this as a N.W. plant, but I have seen no specimens from west of the Khasia Hills.

Sect. II. Stem decumbent below. Leaves not contracted or petioled on the sheath. Gl. I shorter than II, truncate; III broadly truncate; III absent or present.

13. P. Cumingii, Nees in Hook. Kew Journ. ii. (1850) 98; leaves short flat, spikes 2-4 distant slender densely villous with red-brown hairs, spikelets $\frac{1}{10} - \frac{1}{5}$ in. oblong, gl. I dorsally hairy hairs longer than the gl., III 0, IV minute 2-fid, awn very slender 3-4 times as long as the gl., palea minute. Hack. Monogr. Androp. 167 (excl. var. fulva). Steud. Syn. Gram. 373. P. fulva, var. leptophylla, Benth. Fl. Austral. vii. 526. Andropogon aureo-fulvus, Steud. l. c. 373. A. Leschenaultianus, Decne. Herb. Timor. Descr. 29.

UPPEB GANGETIC PLAIN; Moradabad, Thomson. Kumaon; at Dehra-dun, Duthic. Sikkim Terai, Clarke.—Distrib. E. Asia, Malaya, Australia.

Stem 12-18 in., hardly thicker than a sparrow's quill, tufted, decumbent below with a cending leafy branches; nodes sometimes proliferons. Leaves 2-4 in., linear-lanceolate, finely acuminate; lower sheaths hairy; ligule 0 or obscure, hairy. Peduncle filiform. Spikes slender, 1\frac{1}{2} in., subdigitate; joints villous, shorter than the spikelets. Spikelets with a shortly bearded callus; gl. I truncate, often 2-cuspidate, 2-nerved or nerveless, margins and tip oiliate; II longer and broader than I, truncate, keel ciliate above the middle, sometimes shortly awned; III absent in all the specimens which I have examined; IV very variable, narrow with subulate lobes in the Moradabad specimen, most minute and 2-toothed in the Sikkim and Kumaon ones, with lanceolate subulate lobes in Tonkin ones.

14. P. Ridleyi, Hack. in Ester. Bot. Zeitschr. xl. i. (1891) 7; spikes 3-6 digitate, spikelets \(\frac{1}{2} \) in., gl. I broadly truncate entire or 3-toothed densely villous with dark brown hairs shorter than the gl., II cuneate-obovate, III present or ab ent, IV short linear-oblong abruptly awned, awn twice as long as the spikelet or imperfect, palea minute or 0.

MALAY PENINGULA; Pahang and Johore, Ridley, Feilding.—DISTRIB. Borneo. Stem compressed, 6-10 in., creeping below. Leaves 6-20 by 10-3 in., subdictiohous, rigid, flat or convolute; sheath glabrous. Spikes 1½-2½ in., erect, rather stout, joints and pedicels = ½ the spikelets, stiffly ciliate. Spikelets linear-oblong; gls. dark; I ciliate at the truncate apex, dorsally flat; II sub 3-nerved; III if present hyaline, obscurely 3-nerved, with an oblong palea larger than itself; IV half as long as II.—Habit of P. Cumingii, but the leaf-sheaths are all glabrous, the spikes fewer digitate much darker coloured, the hairs of gl. I are much shorter and paler.

Sect. III. LETTATHERUM. Stem prostrate or decumbent. Leaves conspicuously contracted at the base or petioled; basal sheaths naked. Gl. I often deeply channelled dorsally; III present or absent, empty or male; when absent the palea is sometimes as long as gl. I, hyaline or rigid, faintly 2-nerved or nerveless.

- * Triandrous; anthers long narrow.
- 15. P. eucnemis, Neesex Steud. Syn. Gram. 409; leaves subpetioled, spikes few or many more or less villous with purple hairs, joints short clavate, spikelets 1 in. oblong, gl. I dorsally sulcate truncate keels shortly

ciliate, IV shortly 2-fid, palea minute. Hack. Monogr. Androp. 173.—Andropogon, Wall. Cat. n. 8812.

BUEMA; near Prome, Wallich; Popan district, Collett; PEGU, Scott, Kurs.—DISTRIB. Colebes.

Stems elongate, diffusely branched, stout or slender, smooth, polished; nodes glabrous; sheaths much shorter than the internodes. Lauves 2-10 in., from elliptic to lanceolate, acute, tips setaceous, nerves slender, and sheath sparsely hairy; ligule short, ciliate. Spikes 6-20, densely fascicled, 3-5 in. long, rather stout, pule; joints half as long as the spikelets, often pyriform, margins densely ciliate with purple hairs. Spikelets shining, callus shortly bearded; gl. I truncate, strongly ciliate, dorsally scaberulous; II 2-toothed, shortly awned; III 0, or very slender, ciliate, with a lanceolate acuminate glabrous 2-nerved palea as long as gl. I, triandrous or neuter; IV minute, oblong, acutely 2-toothed; awn very slender i 1 in.

16. P. Stapfii, Hook. f.; branches tall from the distant smooth internodes of a long prostrate stem, leaves elliptic-lanceolate acuminate, spikes erect densely fascicled shortly stipitate thickly softly hirsute with fulvous brown hairs each with imperfect naked spikelets at the base, joints and pedicels very stout hollow, gl. I dorsally flat truncately 2-toothed hirsute all over 5-7-nerved, II dorsally convex hirsute aristulate, III 0, IV minute 2-toothed, awn very slender, palea very small, pedicelled spikelet very small awned.

ABRACAN; on low hills of sandstone at Akyab, Kurs.

Stem prostrate and ascending, 12-18 in. long and more, rooting at the lower swollen nodes, as thick as a crow-quill, fistular; internodes 2 in. long, quite smooth; branches 2-3 ft. high, again branched, erect, internodes much longer than the sheaths, the lower of which are open and scarious. Leaves 4-6 by \(\frac{1}{2}\) \frac{1}{2}\) in., flat, flaccid, very thin, setaceously acuminate, sparsely hairy, midrib slender, margins smooth; ligule membranous, truncate, ciliate. Spikes 2-3 in., erect; joints \(\frac{1}{2}\) shorter than the spikelets and nearly as broad as the sessile one, very stout, truncate, plano-convex, hirsute all over the back and sides; pedicel of upper as large as the joint but rather shorter. Sessile spikelet concealed between the joint and pedicel, \(\frac{1}{2}\)—in.; callus short, hirsute; gl. I oblong, flat, sub 2-toothed, 5-nerved, nerves sometimes anastomosing, margins narrowly incurved from base to tip, copiously ciliate; II cymbiform, 1-nerved, 2-toothed; IV and its nerveless oblong pales, eciliate; awn = spikelet or longer, very slender, column twisted. Pedicelled spikelets = about \(\frac{1}{2}\) the sessile, elliptic, shortly hirsute, fem. or neuter, gls. \(\frac{4}{2}\). Basal spikelets of the spikes smaller than the perfect, sessile, closely appressed to the rachis, sparsely hairy or nearly glabrous, gl. I dorsally more or less channelled.

17. **P. vagans**, Nees ex Steud. Syn. Gram. 410; leaves sessile, spikes 3-5, joints slender shortly ciliate, spikelets $\frac{1}{3-\frac{1}{6}}$ in. linear-oblong, gl. I obovate-oblong dorsally sulcate glabrous ciliate, IV very minute 2-toothed, awn twice as long as the spikelet, palea minute toothed. Hack. Monogr. Androp. 173.—Andropogon, Wall. Cat. n. 8807 B.

NEPAL, Wallich.

Stem laxly branched; slender, glabrous. Leaves 2-4 in., very narrow, setaceously acuminate, scaberulous, glabrous. Spikes very slender, rachis glabrous.
Spikelets reddish, callus shortly bearded; gl. I chartaceous, dorsally smooth; II
membranous, subscute, keel above and margins ciliate; III usually 0, if present
male or neuter; palea lurger than its gl., oblong, obtuse, rather shorter than gl. I,
membranous, 2-nerved, ciliate; IV smaller than its small subquadrate 8-4-toothed
palea.

18. P. grata, Hack. Monogr. Androp. 175; nodes of stem pubescent, leaves sessile, spikes few or many dersely fascicled, joints subclavate

shortly densely ciliate, spikelets $\frac{1}{2} - \frac{1}{4}$ in. oblong. gl. I dorsally channelled keels rigidly ciliate towards the truncate or 2-toothed tip, II mucronate or aristulate, III 0, palea ovate-lanceolate bisexual ciliate, IV minute 2-toothed, awn long or short, palea small ovate. P. ciliata, Nees in Pl. Meyen. 186. PP. montana, Nees ex Steud. Syn. Gram. 409. Ephebopogon, gratus, Nees mss. ex Hack. l. c.

SINKIM HIMALAYA, the KHASIA and MISHMI HILLS, alt. 1-5000 ft., Griffith, &c.,—DISTRIB. Java, China.

Stem rather stout, 3-5 ft., pubescent or scaberulous below the nodes. Leaves 4-8 by \(\frac{1}{2} \) \(\frac{1}{2} \) in., linear, setaceously acuminate, scaberulous and sparsely hairy; sheath bearded at the nodes; ligule obscure. Spikes 2\(\frac{1}{2} \) 4 in., pale or dark, joints = \(\frac{1}{2} \) spikelet, rather longer than the pedicels; gi. I dorsally smooth or scaberulous.—This resembles P. eucnomis more than any other species, but has more numerous and darker spikes with more slender joints, and the nodes are pubescent. In some spikelets I find no gl. III or its palea, only an overy and the ciliate palea of gl. IV.

PVar. hirruta; leaves 1 in. broad pubescent, sheath clothed with very long spreading and reflexed hairs, gl. IV all but reduced to the awn. Pegu, Kurs.

19. P. ciliata, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 306; leaves sessile, spikes very many, joints slender compressed rather shorter than the spikelets shortly ciliate, spikelets in narrow pale, gl. I lanceolate deeply grooved dorsally keels scabrid below ciliate towards the forked tip, II awned or mucronulate, III 0, palea empty or male, IV minute lanceolate or broader and 2-toothed, awn long or short, palea minute. Hack. Monogr. Androp. 176; Steud. Syn. Gram. 410. P. Wallichiana, Nees ex Steud. l. c.; Thw. Enum. Pl. Zeyl. 369; Trim. Cat. Ceyl. Pl. 107. P. lancea & laxa, Nees ex Steud. l. c. 379. A. fasciculatus, Linn. Sp. Pl. 1047.—Andropogon, Wall. Cat. n. 8815 B, 8822, 8823.—Batratherum,? Wall. l. c. n. 8831 in part.

TROPICAL HIMALAYA, alt. 2-5000 ft., from Kumaon to the Mishmi and Khasia Hills. Behab, on Parusnath, Clarke. NILGHIBI HILLS, Wight. CRYLON, Thwaites.

Stems 2-4 ft., much branched below, straggling, glabrous or sheaths sparsely hairy; peduncle very sleuder. Leaves very variable, usually small, 1-4 by 1-1 in., narrowed at both ends, finely acuminate, sometimes petioled. Spikes flexuous. Gl. I minutely scaberulous; II sometimes with the awn longer than itself; IV variable, as is its palea, both in breadth and length. Anthers very long.—I am puzzled with various forms of the glumes of this plant. Hackel has four varieties: a. genuina (P. ciliata, Trin., P. lancea, Nees) with linear-oblong spikelets, gl. I entire, keels pectinately ciliate, II mucronulate, IV 2-toothed long awned;—b. laxa (P. laxa, Nees) with linear-lanceolate spikelets, gl. I pectinately ciliate, II swned, IV entire long awned;—c. Wullichiana (Nees Sp.), spikelets linear-oblong, gl. I entire rigidly pectinately ciliate, II long-awned, IV entire, awn imperfect;—d. seminuda, spikelets linear-lanceolate, gl. I bimucronate, keels scabrid, II long-awned, IV entire, awn imperfect.—Ceylon (C.P. 411 in part).

20. P. monantha, Nees ex Steud. Syn. Gram. 410; very slender, spikes 4-6 slender flexuous joints shorter than the spikelets subclavate, spikelets \(\frac{1}{14\top10}\) in., 1-fld., gl. I narrow ciliate dorsally channelled, II truncate apiculate, III 0, IV minute rounded 2-toothed, awn about twice as long as the spikelet, palea very minute ovate. Hack. Monogr. Androp. 174. P. miscantha (error for monantha), Herb. Ind. Or. HJ. & T.—Andropogon, Wall. Cat. n. 8819.

Subteopical Himalaya; Garwhal, alt. 5000 ft., Duthie. Sikkim Terai,

J.D.H. KHASIA HILLS, alt. 4000 ft., J.D.H. & T.T. BURMA, Thongdong,

Wallich; Rangoon, M Lelland; King's Isld., Helfer.

Stems 1-3 ft., nodes naked. Leaves 3-6 in., base contracted, flaccid. Spikes 3-6, 2-4 in. long, very slender, pale green or yellowish brown; joints compressed, broader upwards, ciliate. Glames usually widely spreading; I subscute or narrowly truncate, keels scaberalous or shortly ciliate above; II with villous margins towards the mucronate or aristulate tip; IV very minute, rounded. Asthers linear, half as long as the gl. or more.—Resembles P. ciliata, but the spikelets are much smaller.

21. **P. delicatula**, Hook. f.; stem very slender vaguely geniculately branched leafy, leaves linear-lanceolate acuminate base very narrow, spikes 3-5 fascicled slender pale, joints linear, margins shortly ciliate, spikelets $\frac{1}{18}-\frac{1}{10}$ in., callus stellately bearded, gl. I thin linear-oblong truncate dorsally convex shining, keels ciliate above the middle, II apiculate keel ciliate, III 0, IV awn simple or minutely dilated at the base.

PEGU, M'Lelland, Kurs.

Stems 1-2 ft., straggling, as thick as a sparrow's quill or less, smooth. Leaves 2½-5 by ½-½ in., flat, thin, sparsely ciliate chiefly towards the base, tip capillary, margins smooth, base a mere point, midrib slender; sheath very slender; ligule minute. Spikes 2-1½ in., erect, flexuous, pale green, joints truncate. Gl. I. of sessile spikelet 0-5-nerved, tip more or less 2-toothed; II obtuse, 3-nerved; IV awn capillary about — the spikelet. Pedicelled spikelet like the sessile or reduced, awned or not, male or neuter. Stamens 3, imperfect only seen, filaments short.

- ** Triandrous, anthers minute, filaments very long.
- 22. P. imberbis, Nees ex Steud. Syn. Gram. 410; stem very slender grooved, spikes solitary or few and racemose very slender, joints compressed, spikelets \(\frac{1}{2} \) in. lanceolate, gl. I narrow subtruncate keels minutely scabrid, II acute nearly glabrous, III-0, IV minute ovate-lanceolate, palea ovate, awn short. Hack. Monogr. Androp. 177; Duthie Grass. N.W. Ind. 16. P. japonica, Franch. & Sav. Enum. Pl. Jap. ii. 608 (non Miq.). P. Willdenowiana, Benth. in Journ. Linn. Soc. xix. (1881) 67. Andropogon vimineus, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1883) 268. Microstegium Willdenowianum, Nees ex Steud. lc. 411.—Arthraxon, Wall. Cat. n. 8838.—Batratherum? Wall. Cat. n. 8832.

TEMPERATE HIMALAYA; Simla, Gamble; Nepal, Wallick; Sikkim, alt. 4-7000 ft., J.D.H., Clarke. Khasia Hills, alt. 4-5000 ft.—Distrib. China, Japan.

Leaves narrowed to the base, flaccid, smooth or subscaberalous. Spikes 1-3 in., not fascicled, green, joints more or less ciliate, hardly clarate; callus naked; gl. I concave dorsally, 2-6-nerved, nerves sometimes anastomosing; II 1-3-nerved; awn of IV sometimes capillary, and very short (var. Willdenowiana, Hack.); sometimes (var. generina, Hack.); sometimes (var. Willdenowiana, Hack.); sometimes (var. generina, Hack.); sometimes (var. generin

- *** Diandrous, anthers linear-oblong.
- 23. P. nuda, Trin. in Mem. Acad. Petersb. Ser. ii. (1833) 307; very slender spikes few racemed very slender, joints slender terete, spikelets 1-1 in. narrowly lanceolate, gl. I bicuspidate very narrow keels scaberulous, II acuminate, III as long as II hyaline ciliate or 0, IV lanceolate, palea

minute truncate, awn short. Hack. Monogr. Androp. 178; Steud. Syn. Gram. 410. P. japonica, Miq. Ann. Mus. Lugd. Bat. ii. 290. Leptatherum Royleanum, Nees in Proc. Linn. Soc. i. (1841) 93; Franch. & Sav. Enum. Pl. Jap. ii. 609.—Batratherum? Wall. Cat. n. 8831 in part.

TEMPERATE HIMALAYA; from Chamba to Upper Assam, alt. 4-7000 ft. (to 10,000 in Kumaon), Khasia Hills, alt. 4-5000 ft., Griffith, &c.—Distrib. China, Japan, S. Africa.

Stem 2-3 ft., grooved. Leaves 1-4 in., lanceolate, very variable in breadth, acuminate, flaccid; sheath hairy; ligule glabrous. Spikes 3-5, rarely more, 1-4 in. long, flexuous, green; joints longer or shorter than the spikelets, glabrous or ciliolate. Spikelets sometimes distant, callus nearly naked or villous; gl. I rarely truncate or obtuse, often strongly forked, dorsally concave, glabrous or most minutely scaberulous, margins rarely ciliate; II nearly glabrous; III if present marrow, glabrous or sparsely ciliate, nerveless; IV variable in size, never = \frac{1}{4} III, \sim 3-nerved.

EXCLUDED SPECIES.

P. JAPONICA, Benth. ex Duthie Grass. N.W. Ind. 16.—Duthie gives this grass which is no doubt Eurianthus fulcus, as a native of the Panjab and N.W. Himalaya up to 9000 ft. I find no authority for the name. P. japonica, Franch. & Sav. is P. imberbis, Nees, and P. japonica, Miq. is P. nuda; both are Japanese and Himalayan plants. There is also Eulalia japonica, Trin. (Mischanthus sinensis, Anderse.), which is not Himalayan.

35. SACCHARUM, Linn.

Tall perennial grasses. Infl. a large silky much and densely branched panicle, with spreading at length erect articulate capillary branches and branchlets (spikes). Spikelets minute, awnless, 1-fid., binate, a sessile bisexual and pedicelled, fem., rarely both pedicelled and bisexual. Glumes 4, all membranous, or I strongly chartaceous, or I and II rarely coriaceous; III empty; 1V shortest, rarely 0; palea hyaline nerveless or 0. Lodicules cuneate. Stamens 3. Stigmas laterally exserted. Grain oblong.—Species about 12, tropical, chiefly Asiatic.

- Sect. I. Eusaccharum. Rachis of spike fragile. Spikelets of each pair subequal, sessile and pedicelled, both fertile. Stem solid.
- S. OFFICINARUM, Linn. Sp. Pl. 54; stem solid glabrous below the panicle, upper leaves long margins scabrid, joints of spikes and pedicels, glabrous, hairs of callus about twice as long as the spikelet, gl. I glabrous subchartaceous, IV very narrow or 0, palea small lanceolate. Roxb. Fl. Ind. i. 237; McFad. in Hook. Bot. Misc. i. (1830) 95, t. 26; Steud. Syn. Gram. 405; Hack. Monogr. Androp. iii. 111; Miq. Fl. Ind. Bat. iii. 507. Morris in Journ. Linn. Soc. xxviii. (1890) 197. t. 23. S. sinense, Roxb. l. c.

Cultivated in the hotter parts of INDIA.—Native country unknown. For history and cultivation of the sugar-cane in India see Watts' "Dictionary of the Economic Products of India," and for its origin A. de Candolle "L'Origine des Plantes Cultivées."

1. S. spontaneum, Linn. Mant. ii. 183; stem silky below the panicle, upper leaves long margins smooth, hairs of callus many times longer than the spikelet, gl. I thickened below, IV usually 0, palea ciliate. Rocb. Fl. Ind. i. 235; Kunth Enum. Pl. i. 475, Suppl. 384; Wight Cat. n. 1682; Griff. Notul. iii. 73, Ic. Pl. Asiat. t. 139, f. 63; Dalz. & Gibs. Bomb. Fl. 304; Thw. Enum. Pl. Zeyl. 369; Trim. Cat. Coyl. Pl. 106.

Aitchis. Cat. Panjab. Pl. 172; Duthie Grass. N.W. Ind. 15, Indig. Fudd. Grass. 57, Fudd. Grass. N. Ind. 25; Steud. Syn. Gram. 405; Hack. Monogr. Androp. 113; Anderss. in Evers. Vet. Akad. Handl. Stockh. (1885) 156; Mig. Fl. Ind. Bat. iii. 512. S. ægyptiacum, Willd. Enum. Hort. Berol. i. 82; Boiss. Fl. Orient. v. 454. S. bengalense, Bogs, Casi, Lola & tennius, Herb. Ham. ex Wall. Cat. n. 8854. S. biforum, Forsk. Fl. Æg. Arab. i. 16. S. caducum, Palisotii & speciosissimum, Tausch in Flora (1836) 527; Steud. l. c. 406, 405, 407. S. canaliculatum, Roxb. l. c. 246; Wight Cat. n. 1682; Duthie Grass. N.W. Ind. 14; Steud. l. c. 406. S. chinense, Nees in Hook. & Arn. Bot. Beech. Voy. 241. S. Glaza, Reinw. ex Blume Gew. Buitenz. 38. S. insulare, Brongn. Voy. Coq. Bot. 99; Steud. l. c. 406. S. Klaga, Jungh. ex Tijdschr. Nat. Gesch. vii. 296; Steud. l. c. (Klagha). S. punctatum, Schum. Besch. Pl. Guin. 46. S. propinquum, Steud. l. c. 8. semidecumbens, Roxb. l. c. 236; Duthie l. c. Steud. l. c. 406; Wall. Cat. n. 8854. A. Imperata spontanea, Beauv. Agrost. 8; Roem. & Sch. Syst. ii. 289; Miq. Fl. Ind. Bat. iii. 512.—Saccharum, Wall. Cat. n. 8854.

Throughout the warmer parts of INDIA and CEYLON, ascending to 6000 ft. in the Himalaya.—Distrib. S. Europe and warm regions of the Old World. East Australia.

Stem 5-20 ft., erect from a stout rootstock. Leaves erect, very long, narrow, margins convolute or incurved; mouth of sheath woolly; liquie membranous. Paniels 1-2 ft.; branches whorled, spreading; branchlets fragile; joints filiform, dorsally long-ciliate. Spikelets \(\frac{1}{2}\)-\frac{1}{2}\) in, lanceolate; gl. I 2-nerved; II lanceolate, subkeeled; III ovate-lanceolate, subacute, ciliate; IV very variable.—Hackel recognized two subspecies and several varieties of them.

Subsp. indicum; slender, leaves narrow, ligule ovate subscute, spikes slender lax-fid., spikelets 1-1 in. 4-6 times shorter than the snow-white villi.—All parts of India.

Subsp. agyptiacum; slender, leaves broadly linear, ligule truncate, spikes stouter more dense-fid., spikelets longer \(\frac{1}{2}\)-\frac{1}{2}\) in., villi shorter.—Almost confined to Africa, except var. nepalense, with spikelets only \(\frac{1}{2}\) in.—N.W. India, Royle (0. 197).

2. S. arundinaceum, Retz. Obs. iv. 14; stem glabrous below the panicle, upper leaves long margins hispidly ciliate, joints and pedicels glabrous or ciliate, hairs of callus silky much shorter than the spikelet, gl. I chartaceous acuminate dorsally villous, IV broadly lanceolate. Kunth Enum. Pl. i. 475; Hack. Monogr. Androp. 117; Steud. Syn. Gram. 407. PS. benghalense, Retz. l. c. 16. S. ciliare, Anderss. in Œvers. Vet. Akad. Handl. Stockh. (1855) 155; Hack. l. c. 118 (excl. vars. β. γ.). S. exaltatum, Roxb. Fl. Ind. i. 245; Wight Cat. n. 1681; Grah. Cat. Pl. Bomb. 239; Steud. l. c. S. Moonja, Royle Ill. Himal. Pl. 416. S. Munja, Roxb. l. c. 246. S. procerum, Roxb. l. c. 243; Steud. l. c.; Trim. Cat. Ceyl. Pl. 106; Duthie Grass. N.W. Ind. 15. S. Sara, Roxb. l. c. 244; Kunth l. c.; Steud. l. c. 406; Aitchis. Cat. Panjab. Pl. 172; Duthie Grass. N.W. Ind. 15, Indig. Fodd. Grass. t. 50, Fodd. Grass. N. Ind. 15; Boiss. Fl. Orient. v. 453; Hack. l. c. 118; Wall. Cat. n. 8353, A. D. S. Surpata, Hb. Ham. ex Wall. Cat. 8853 D.—Saccharum, Wall. Cat. n. 8852, 8853—Rheede Hort. Mal. xii. t. 46.

Throughout the Plains and low Hills of India. CEYLON, at Colombo, Trimon. —DISTRIB. China.

Perennial. Stem 10-20 ft. erect from a stout rootstock, branching after the second year. Leaves 8-5 ft. by 2-3 in., broadest about the middle, tapering to a slender point, midrib white; sheath bearded about the mouth; ligule short, hairy.

- Pasicle 1-2 ft., erect, ovoid or oblong; branches half-whorled, clothed with soft cream-colrd. rarely purplish hairs. Spikes 1-3 in., rachis capillary. Spikelets 10 in., lanceolate, pale green violet or brownish; gl. I dorsally flat or depressed. nerveless except the keels; II lanceolate, shortly acuminate; III oblong-lanceolate; IV mucronate.—Hackel includes under S. citiare, S. Griffithii, Munro, which is regarded by Dr. Stapf and myself as an Erianthus, gl. IV being clearly awned. S. benghalense is a doubtful plant, wanting, according to Hackel, in Retz's Herbarium.
- 3. S. Marenga, Ham. in Wall. Cat. n. 8856; stem slender silky below the panicle, nodes bearded, leaves scabrid above uppermost subulate, branchlets of panicle clothed with purple hairs, pedicels clavellate hispidulous, hairs of callus rigid, gl. I coriaceous glabrous or hairy below, II oblong coriaceous tip membranous. Hack. Monogr. Androp. 119; Duthie Grass. N.W. Ind. 14. Eriochrysis Narenga, News. Steud. Syn. Gram. 411; Aitchis. Cat. Panjab Pl. 172.—Saccharum, Wall. Cat. l. c.

TROPICAL HIMALAYA, from Garwhal, alt. 3-4000 ft., to the KHASIA HILLS, UPPER and LOWER BENGAL, ASSAM, SILHET, CENTRAL INDIA, and BURMA.—DISTRIB, Tonkin, China.

Stem 6-8 ft.; internodes often longer than the sheaths, nodes stellately bearded. Leaves 1-2 ft. by \(\frac{1}{2} \) in., linear, base narrow, flat; sheath with tubercle-based hairs; ligule rounded. Pasicle 12-18 in., narrow; rachis scaberulous, bearded at the nodes; branches 2-4-nate, appressed to the fragile rachis, branchets fascicled. Spikelets \(\frac{1}{10} \) in., callus minute, hairs longer or shorter than the spikelet; gl. I ciliolate; IV linear-oblong, ciliate.—Hackel has two varieties: a. genuinum, Himalayan, with gl. I and II of the sessile spikelet obtuse, glabrous; \(\hat{\theta} \). khasianum, with the corresponding gl. subacute, densely hairy below.

- Sect. II. Sclenostachya (Anderes.). Rackie of spike tenacious. Both spikelets of each pair pedicelled. Stem fistular.
- 4. S. fuscum, Roxb. Fl. Ind. i. 236; stem stout silky or villous below the panicle, rachis of panicle villous, spikes nodding, hairs of callus about the length of the oblong or obovoid spikelets, gl. I obtuse, keels ciliate, III and IV ciliate. Hack. Monogr. Androp. 121; Kunth Enum. Pl. i. 474, Suppl. 385; Steud. Syn. Gram. 406; Duthie Grass. N.W. Ind. 14. 8. Modhara, Ham. in Wall. Cat. n. 8855 C. Tricholsena; Iusca, Schult. Mant. ii. 164. Eriochrysis fusca, Trin. in Mem. Acad. Petersb. Ser. vi. (1833) II. 315; Steud. l. c. 411. E. fusca & attenuata, Nees en Steud. l. c. Miscanthus fuscus, Benth. in Journ. Linn. Soc. xix. (1881) 65.—Saccharum, Wall. Cat. 8855.

Upper and Lower Gangetic Plains, Assam, the Khasia Hills, the Western

GHATS, and BURMA.

- Stem 5-8 ft. or more, as thick as the little finger. Leaves 3-4 ft. by 1-2 in., linear-lanceolate, rigid, glabrous, margins scabrid; margins of sheath flubriate; ligule rounded. Pasicle 1-2 ft., narrow, branches whorled or fascicled or subscittary, nodes bearded; spikes or branchlets nodding, alender, flexuous; joints trigonous, glabrous. Spikelets \(\frac{1}{2}\) in., brown, upper and lower alike; gl. I entire, margins narrowly inflexed, dorsally flat smooth shining; II subscute, keeled, 1-nerved; III ovate-oblong, obtuse, nerveless, ciliate above; IV like III but shorter, ciliate with rigid hairs; palea much shorter ovate, ciliate. Grain obovoid, smooth, brown.
- 5. S. Ridleyl, Hack. in Cetr. Bot. Zeitschr. xli. (1891) 6; stem glabrous below the long narrow paniele, rachis of paniele glabrous, spikes erect very long filiform lax-fid., hairs of callus i the length of the oblong-

lanceolate spikelets, gl. I 2-toothed keels minutely spinulous, III and IV pectinately ciliate with very long hairs.

MALAY PENINSULA; Pahang, Ridley.

Stem several feet high. Leaves 2-8 ft. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., linear, rigid, green, glabrous, margins scabrid; sheath terete, glabrous; ligule very short, truncate. Pasicle 2 ft. long, erect; rachis angular, subgeniculate at the distant bearded nodes; branches fascicled, very long, filiform; spike 3-5 in., firm, flexuous, lax-fid., glabrous except the bearded axils; joints and pedicels slender, glabrous, terete. Spikelets both pedicelled equal and perfect, \(\frac{1}{2}\) in. long, yellowish-brown; pedicel of lower = \(\frac{1}{2}\) the length of the upper which is about \(\frac{1}{2}\) shorter than the joint; gl. I chartaceous, dorsally flat, sides incurved and base sparsely hairy, 2-3-nerved besides the keels; II chartaceous, acute, 3-nerved, sparsely hairy; III nearly equal II, nerveless, margins incurved the long hairs crossing; IV rather shorter, broadly ovate, nerveless, its long hairs up-curved; palea variable, small or minute, ciliate.

DOUBTFUL SPECIES.

S. BRUNNEUM, Desv. Opusc. 65, is a species of Tricholsena, according to Hackel (Monogr. in Index, p. 707), but as that genus is suppressed and the only Indian plant referred to it is S. fuscum (q. v.), it follows that S. brunneum may be that plant, and if so Lesvaux's name has priority.

36. BRIANTHUS, Michx.

Habit and characters of Saccharum, but gl. IV awned, rarely awnless. Species about 16, temperate and tropical.

I find no characters whereby to distinguish *Erianthus* from *Gaccharum* except that given above, which is all but illusory, and a re-examination of both genera may lead to a better disposition of their species under two or more genera or sections. *Pollinia* differs chiefly in the digitate spikes (see *E. fastigiatus*).

- A. Lower branches of the panicle much shorter than the rachis.
- * Panicle decompound; ultimate branchlets (spikes) very short, of 3-4 joints; awn of gl. IV short or obsolete.
- 1. E. Ravennes, Beauv. Agrost. 14; leaves flat, ligule very short, panicle oblong, hairs of callus as long as the gls., spikelets 1-1 in. Imear-lanceolate, gl. I membranous lanceolate acuminate tip 2-mucronate keels subspinulosely scabrid, IV rather shorter than I ovatelanceolate narrowed into a slender awn of its own length or shorter. Kunth Enum. Pl. i. 479, Suppl. 389; Hack. Monogr. Androp. 139; T. Nees Gen. Fl. Germ. Monocot. n. 90; Reichb. Ic. Fl. Germ. t. 55; Ledeb. Fl. Ross. iv. 475; Boiss. Fl. Orient. vi. 455; Duthie Grass. N. W. Ind. 15, Fodd. Grass. N. Ind. 26. E. jamaicensis, Anderss. in Evers. Vet. Akad. Handl. Stook. (1855) 163. Saccharum Ravennes, Murray Syst. Ed. xiii. 88; Sibth. & Sm. Fl. Grasc. i. 38, t. 52; Steud. Syn. Gram. 48. S. jamaicense, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 312. Andropogon Ravennes, Linn. Sp. Pl. Ed. II. 1481; Host. Gram. Austr. iii. 1, t. 1. Ripidium Ravennes, Trin. Fund. Agrost. 169.

WESTERN HIMALAYA and WESTERN TIBET, alt. 6-9000 ft., from Kashmir to Kumaon, the Panjab and Upper Gangeric Plain, from the Indus to Delhi.—Distrib. Westward to the Mediterranean.

Stem 6-10 ft., nodes glabrous. Leaves 2-3 ft. by 1-1; in., linear, scaberulous on both surfaces, bearded at the base with golden hairs, margins scabrid; midrib broad;

VOL. VII.

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sheath hairy; ligule silkily villous. Panicle 1-8 ft., erect or inclined, greyish-white with silkily villous hairs; spikes (terminal branchlets) about \(\frac{1}{2} \) in., joints and pedicels filiform, half as long as the spikelets or more, ciliate with long hairs. Spikelets pale; gl. I with one or both margins incurved, nerves 1-8 between the keels; II rather longer, acuminate or aristulate, 3-nerved, keel scabrid; III lanceolate, ciliate, 1-nerved, hyaline; IV glabrous or ciliolate, 3-nerved, rarely awnless; palea shorter, ovate-lanceolate, glabrous. Pedicelled spikelet, gl. I strongly 2-3-nerved, villous below as is gl. II.—A very variable grass in stature, colour of the hairs of the panicle, size of the spikelets, and length of the awn.

Var. purpurascens, Hack. l. c.; spikelets more or less tipped with violet or purple.

E. purpurascens, Anderss. l. c. 161.—Common in N.W. India.

2. B. Griffithii, Hook. f.; leaves very narrow rigid semiterete concave above, ligule long, panicle oblong very pale, callus densely villous with spreading hairs as long as the lanceolate acuminate or acute spikelet, gl. i and II dorsally villous, keels spinulose, IV ovate-lanceolate ciliate narrowed into the short awn. Saccharum Griffithii, Munro ex Aitchis. in Journ. Linn. Soc. xix. (1882) 191 (name only). S. ciliare, var. β. Griffithii, Hack. Monogr. Androp. 119. S. Sara, Aitchis. l. c. ex Hack. l. c.

PESHAWUR, Stewart. WESTERN TIBET; below Rondu, Thomson .- DISTRIB.

Affghanistan, Beluchistan.

Stem tall, tufted, glabrous, solid, as thick as a swan's quill, quite glabrous, pale, polished. Leaves 2-3 ft. by 1-1 in., thickly corraceous, rigid, quite smooth, dorsally rounded, upper surface concave, margins scaberulous; sheath smooth, polished, shining; ligule long, ciliate with long hairs. Panicle 6-12 in., contracted, thyrsiform, inclined, pale yellow when dry; rachis glabrous; lower branches 1-2 in, joints about 1 as long as the spikelets and pedicels villous with long pale hairs. Spikelets pale, often tipped with purple; callus hairs about as long as the spikelets. or shorter, white or pale brownish; gls. I and II subequal; I 8-nerved, margins narrowly incurved, scabrid; II rather longer, acuminate; III lanceolate, 1-nerved, hyaline, margins long-ciliate; IV as long as III, 3-nerved, narrowed into a short included or shortly exserted awn; palea much shorter than the g., more or less ciliate.—Referred to Saccharum ciliare (arundinaceum) by Hackel, from which the awned gl. IV at once distinguishes it, and much more closely allied to Erianthus Ravenna, differing in the pale straw-colour of its stem, leaves and panicle, rigid 1-terete leaves concave on the upper surface, long ligule, and dorsally hairy gl. I and Griffith, Itinerary Notes, 817 (n. 1193) describes this as a large grass, 6-7 ft. high, with white spikes, very common at 5000 ft. at Jugdulluk (Affghanistan).

3. E. elephantinus, Hook. f.; gigantic, leaves broad flat, panicle very large supradecompound, spikelets 13-15 in., hairs of callus as long as the gls. or longer, grey or purplish, gl I narrowly ovate-lanceolate dorsally sparsely hairy keels scabrid, II lanceolate acuminate subaristate 1-nerved, IV shorter than I ovate-lanceolate 3-nerved eciliate narrowed into a shortly exserted awn.

Assam, Griffith, Simonds.

Stem very tall and stout, as thick as the middle finger below the panicle, quite smooth, glabrous. Leaf (upper) two or more feet long by \(\frac{1}{2} \) in. broad, quite smooth on both surfaces, margins serrulately scabrid; sheath several feet long; ligule of long straight hairs. Panicle 14 in. long, oblong, inclined; rachis as thick as the little finger below, glabrous, polished; lower nodes \(4 \) in. apart, branches numerous, lower fascicled and half-whorled 6-8 in. long. Spikes few-fld., capillary, fragile; joints and pedicels half as long as the spikelets or longer, villously ciliate, tops cupular. Spikelets ovate-lanceolate, pale; gl. I and II subequal, membranous; I lanceolate, acuminate, tip minutely 2-toothed, dorsally flat, with one median nerve, margins marrowly incurved; II ciliate; III as long as I, hyaline but stiff, 1-nerved, ciliate, margins incurved; IV shorter than III, quite glabrous; pales nearly as long as the

- gl., lanceolate from a crowded concave base.—Evidently a gigantic species of which I have seen only one specimen of leaves and panicle from the Calcutta Herbarium, and a scrap of a panicle from Griffith.
- ** Branches of panicle long simple much or sparingly divided; spikes many-jointed; awn of gl. IV more than twice as long as the spikelet, rarely (in sikkimensis and chysothrix) shorter or 0.
 - † Gl. IV entire, narrowed into the awn.
- 4. E. fulvus, Nees ex Steud. Syn. Gram. 409; stem silkily villous below the long narrow silkily villous panicle, spikelets \(\frac{1}{10}\) \(\frac{1}{15}\) in. narrowly oblong much shorter than the fulvous purplish or reddish hairs of the callus, gls. I and II hyaline above the middle, IV very narrow. Hack. Monogr. Androp. 147. E. rufipilus, Griseb. in Goett. Nachr. (1868) 93; Duthie Grass. N.W. Ind. 15. E. japonicus, Herb. Strach. & Winterb. n. 2, & Herb. H.f. & T. Saccharum rufipilum, Steud. l. c.—Erianthus, Wall. Gat. n. 8849.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5-7000 ft. Khasia and Naga Hills, alt. 5-5500 ft.

- Stem 6-8 ft., stout; nodes glabrous or pubescent. Leaves 2-3 ft. by \(\frac{1}{2}\)-1 in., flat, glaucous and scaberulous beneath and on the margins; margins of sheath hairy; ligule rounded, ciliate. Panicle 8-18 in., erect, decompound; rachis villous; spikes crowded; joints 8-10 and pedicels filiform, villous, half as long as the spikelets or more. Spikelets concealed by the hairs of the callus and joints, usually brownish; gl. I chartaceous below, tip suddenly acute, quite entire, 1-3-nerved, dorsally flat, glabrous; margins not incurved or below the tip only, ciliolate above; II rather longer, acute or 2-mucronate, glabrous, margins ciliate; III lanceolate, ciliate, acuminate or shortly awned; IV much shorter, ovate-lanceolate, glabrous, 1-nerved; awn \(\frac{1}{2}\)-\(\frac{1}{2}\) in., palea as long as the gl. or shorter or 0? Pedicelled spikelets hardly different from the sessile.—The name fulvus is not appropriate.
- 5. E. sikkimensis, Hook. f.; stem very slender silkily villous below the very narrow stiff panicle, spikelets \(\frac{1}{6} \frac{1}{2} \) in. lanceolate longer than the white hairs of the callus, gl. I tip broadly 2-fid sides villous with long hairs hyaline above the middle, IV very narrow.

SIKKIM HIMALAYA; Lachen Valley, alt. 6000 ft., J. D. H.

- Stem 1-2 ft., as thick as a dove's quill. Leaves narrow, rigid, flat, hairy towards the base, margins scabrous; sheaths glabrous or sparsely pubescent above; ligule rounded ciliate. Panicle 4-6 in., sparingly branched; spikes strict, erect, appressed to the villous rachis, joints and pedicels nearly as long as the spikelet, glabrous. Spikelets erect; gl. I oblong-lanceolate, coriaceous below the middle, dorsally glabrous, sides with long silky hairs, tip bifid with a broad sinus, margins inflexed, keels scabrid, nerves 5 between the scabrid keels vanishing upwards, tips often anastomosing; II chartaceous below the upper hyaline third, keeled, 3-nerved, margins ciliate; III as long as II, thinly chartaceous, 3-nerved, margins incurved ciliste; IV nearly—III, linear-lanceolate, 1-nerved, subciliate, narrowed into a short straight awn; palea nearly—the gl. subulate-lanceolate ciliolate.—Specimens very imperfect.
 - ++ Gl. IV 2-toothed or 2-lobed.
 - § Gl. I. dorsally glabrous or nearly so.
- 6. El. filifolius, Nees ex Steud. Syn. Gram. i. 409; stem pubescent below the narrow panicle, leaves filiform, spikelets 1-1 in. lanceolate rather longer than the hairs of the callus, gl. I of sessile spikelet membranous acute keels scabrid, IV entire or minutely 2-toothed, awn much longer than the spikelet, gl. I of pedicelled spikelet 6-7-nerved. Hack. Monogr. Androp.

146. Saccharum filifolium, Steud. Syn. Gram. 409; Duthie Grass. N.W. Ind. 14.

TEMPERATE WESTERN HIMALAYA, from Chamba to Kumaon, alt. 5-8000 ft.,

Royle, &c.

- Stem 2-3 ft., rootstock woody, nodes pubescent. Leaves 8-12 in., rigid, glabrous, convolute below, narrowed to the hair, tip capillary; sheath glabrous; ligule very short, obtuse, ciliolate. Panicle 6-8 in., red-purple; joints and pedicels = about half the spikelet, ciliate. Spikelets surrounded with dense white hairs; gl. I minutely 2-toothed, margins broadly infexed, dorsally glabrous with 3-4 unequal intracarinal nerves; II like I, 3-nerved, keel smooth; III lanceolate, 2-mucronulate, sub 2-nerved, margins inflexed ciliate; IV shorter, linear-lanceolate, 1-nerved, glabrous; palea short, lanceolate, glabrous.
- 7. E. versicolor, Nees ex Steud. Syn. Gram. 409; stem glabrous below the lanceolate panicle, leaves flat, spikelets 1-1 in. linear-lanceolate concealed by the dense white hairs of the callus, gl. I of sessile spikelet variegated chartaceous below reddish and membranous above, keels smooth, IV cuspidately 2-toothed ciliolate, awn twice as long as the spikelet or more, gl. I of pedicelled spikelet 3-nerved between the keels. Hack. Monogr. Androp. 144; Duthie Grass. N. W. Ind. 16.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 2500-7009 ft.

Stem tall, pubescent below the nodes. Leaves 8-16 by $\frac{1}{2}-\frac{1}{4}$ in., smooth, margins scabrid; sheath glabrous or mouth sparingly hairy; ligule broadly ovate, glabrous. Panicle 8-10 in., rachis and branches opposite, glabrous, axils bearded; joints of spike 5-7 and pedicels $\frac{3}{4}$ as long as the spikelet or longer, shortly ciliate with stiff white hairs. Spikelets usually green and violet below the middle, reddish above it; gl. I tip subscute obtuse or 2-denticulate, nerves 2-3 between the keels vanishing upward; II linear-oblong, entire, 1-nerved, keel scaberulous; III linear-oblong nerveless, tip ciliolate; IV = $\frac{1}{4}$ II, cuspidately 2-toothed; palea $\frac{1}{2}$ shorter, linear-lanceolate acute, glabrous.—I very much doubt this being distinct from E. flifolius and the following; and amongst the numerous specimens of Himslayan Erianthi which I have examined, and which must include these, I find it impossible to refer many with precision to any of these three.

Var. pallens, stem slightly pubescent below the pale lanceolate panicle, leaves flat, spikelets 1 in. oblong 1 shorter than the dense white hairs of the callus, gl. I membranous tip hyaline keels smooth, IV cuspidately 2-toothed ciliolate, awn 8-4 times as long as the spikelet, gl. I of pedicelled spikelet shortly 1-nerved between

the keels. E. pallens, Hack. Monogr. Androp. 145.

8. E. longisetosus, Anderss. ex Benth. in Journ. Linn. Soc. xix. (1881) 67; stem naked below the ovate-oblong panicle, sessile spikelets \$\frac{1}{2}\frac{1}{2}\$ in. lanceolate equalling or rather shorter than the red-brown hairs of the callus, gl. I oblong-lanceolate chartaceous bicuspidate 2-nerved between the smooth keels sides sparsely ciliate, IV narrow 2-fid, awn 4 or 5 times as long as the spikelet, gl. I of pedicelled spikelet 6-7-nerved. Hack. Monogr. Androp. 143; Clarke in Journ. Linn. Soc. xxv. (1889) 85, t. 34. E. mishmeensis, Munro mss.—Erianthus, Wall. Cat. n. 8846.

TROPICAL HIMALAYA, alt. 1-8000 ft., from Nepal to the Mishmi, Naga and

Munnepore Hills, Assam, SILHET and CHITTAGONG.

Stem 6-8 ft., stout, nodes pubescent. Leaves 1-3 ft. by \(\frac{1}{6}\) in., glabrous except at the base within, many-nerved, quite smooth, base often much narrowed; sheath smooth; ligule rounded. Panicle 6-18 in., of many long densely packed solitary or binate long divided soft drooping spikes clothed with pale reddish or golden-brown hairs, rachis glabrous, joints and pedicels slender about as long as the spikelets densely ciliate with long hairs. Spikelets brown below, pale above; gl. I with rather broadly inflexed margins; II oblong-lanceolate, chartaceous, apiculate or

aristulate from a notched tip, 3-nerved, keel smooth, margins villous; III oblong, hyaline, copiously ciliate; IV variable in length, 1-nerved; paléa usually half as long as the gl., very narrow.—In Journ. Linn. Soc. l. c. the authority for the name longisetosus is by oversight given as Thos. Anderson (late Director of the Calcutta Bot. Gardens.)

- §§ Gl. I dorsally villous at the base or all over.
- 9. Elockeri, Hack. Monogr. Androp. 142; stem pubescent below the linear-lanceolate panicle, sessile spikelets 1-1 in. oblong-lanceolate rather longer than the reddish hairs of the callus, gl. I chartaceous acute tip membranous dorsally flat densely villous below the middle, 1-nerved between the scabrid keels, IV obtusely 2-toothed, awn twice or thrice as long as the spikelet, gl. I of pedicelled spikelet 5-nerved villous all over.

SIRKIM HIMALAYA, alt. 1-3000 ft., J.D.H., Clarks. BHOTAN, Herb. Calcutta. —DISTRIB. Yunau.

Stem 2-3 ft., often branched below. Leaves 2-4 ft. by \(\frac{1}{2}\)-1\(\frac{1}{4}\) in.; sheath puberulous, villous at the top; ligule rounded, cilinte. Panicle 10-18 in., rachis pubescent, branches short, 2-3-nate; spikes unequal, joints and pedicels = \(\frac{1}{4}\) the spikelet, ciliate with long hairs. Spikelets rusty red; gl. I villous with white hairs, margins inflexed above the middle, nerves often anastomosing; II oblong, chartaceous, 3-nerved, keel scabrid above; III shorter, lanceolate, nerveless, ciliate, tip dilated; IV awn brown subdorsally inserted; palea minute, long-ciliate.—Very near E. longistosus, and versicolor; hardly distinguishable except by gl. I being dorsally villous below the middle.

10. E. chrysothrix, Hack. in Æstr. Bot. Zeitschr. rli. (1891) 6; stem rusty tomentose below the large panicle, spikes long hairy joints villous with rusty hairs, sessile spikelets \(\frac{1}{2}\) in. linear-oblong, gl. I chartaceous narrowly truncate, dorsally villous all over, IV oblong 2-fid, awn very short or 0. Saccharum longifolium, Munro ex Benth. in Journ. Linn. Soc. rix. (1861) 66. S. fallax \(\beta\), Balansa in Journ. de Bot. (Paris, 1890) 81. Eriochrysis longifolia, Munro mss.

KHASIA and NAGA HILLS, alt. 2-4000 ft., Griffith, &c. - DISTRIB. Tonkin, Borneo.

- Stem 8-10 ft., as thick as the middle finger, solid, smooth. Leaves 2-3 ft., glabrous or hirsute; sheaths with tubercle-based hairs; ligule short. Panicle 1-2 ft., erect, contracted, dense-fid., sometimes rustily villous; rachis angular, hairy, fragile; spikes whorled, 2-3 in.; joints and pedicels half as long as the spikelet, villous. Spikelets brown; gl. I 2-nerved, dorsally flat, keels ciliate; II keeled, truncate, 3-nerved; III shorter, oblong-lanceolate, ciliate; IV = \frac{1}{2} III, ovate or linear-oblong, acutely 2-fid, ciliate; awn in the cleft, \frac{1}{2} in.; palea minute, broad, truncate, ciliate with long hairs.—Very unlike any other Indian species.
 - B. Lower branches of the panicle almost as long as the rachis.
- 11. E. fastigiatus, Nees ex Steud. Syn. Gram. 409; stem silky below the panicle, spikes crowded subdigitately fascicled, spikelets \(\frac{1}{2} \) in. lanceolate much longer than the white hairs of the callus, gl. I chartaceous purplish-brown base dorsally and margins sparsely villous, keels above aculeolate, IV oblong or lanceolate 2-denticulate, awn terminal as long as the spikelet or longer. Hack. Monogr. Androp. 150. Saccharum fastigiatum, Steud. l. c.—Saccharum, Wall. Cat. n. 8847.

Tropical Siekim, the Khasia and Mishmi Hills, Assam, Silhet, Chitta-Gong, Chota Nagpore, Clarke, Belgaum, Ritchie.

Stem 2-8 ft., stout or slender. Leaves 1-2 by 1-1 in., linear from a narrow

base, rigid, flat, smooth, margins scabrid; sheath glabrous, mouth fimbriate; ligule very short, truncate. Panicle oblong or fan-shaped; rachis hairy; spikes crowded, lower 3-5 in. strict slender, joints many and pedicels = \frac{1}{2} spikelet or shorter, villous with long white hairs. Spikelets dark colrd. below paler above; gl. I dorsally subchannelled, scaberulous, ciliate upwards, 1-nerved between the keels; II chartaceous, lanceolate, margins hyaline, III = I, linear-lanceolate, base membranous coloured, hyaline above; IV = \frac{1}{2} II, hyaline, 3-nerved; palea small, ovate, obtuse, glabrous.—Hardly different from a Pollinia.

UNDESCRIBED SPECIES.

E. vulpinus, Nees in Royle Ill. Pl. Himal. 417.

37. ISCHEMUM. Linn.

Annual or perennial grasses. Spikelets usually 2-fld., in solitary digitate or fascicled articulate fragile spikes, binate, a sessile and pedicelled. Sessile spikelets, Glumes 4, I oblong or lanceolate, flat, with inflexed margins, truncate or 2-cuspidate, awnless; II as long as I but narrower, concave, acute obtuse or awned; III hyaline, rarely chartaceous, paleate, triandrous, palea narrow ciliate; IV hyaline, bisexual or fem., usually cleft, awned (rarely awnless), awn inserted in the cleft, or by a minute point below it, branching into 3-nerves; palea linear-lanceolate. Pedicelled spikelet, like the sessile, or broader, often imperfect. Lodicules cuneate-quadrate. Anthers linear. Styles long, stigmas long or short.—Species about 40, chiefly tropical.

Ischæmum differs from Pollinia in the much larger gl. IV. of the sessile spikelet which is usually cleft into lanceolate lobes, and, except in I. angustifolium, in the longer palea of that gl. I find that Hackel's sectional character founded on the shape of the joints is unworkable.

- Sect. I. EUISCHÆMUM. Spikes 2-3, rarely more. Gl. I of sessile spikelets dorsally flat, not deeply channelled or depressed along the mesial line. (See also I. robustum.)
 - * Margins of gl. I narrowly inflexed or incurved from base to apex.
 - † Leaves rounded at the base, sessile on the sheath.
 - § Pedicel of upper spikelet not } the length of the lower spikelets.
- 1. aristatum, Linn. Sp. Pl. 1049 (in part); perennial, leaves sessile long narrow, spikes 2-3 2-5 in., gl. I of sessile spikelet nearly flat oblong obtuse or notched with 2-4 marginal nodules or low transverse ridges, IV deeply 2-fld, awn geniculately inserted at the cleft, upper spikelet dimidiate-ovate. Kunth Enum. Pl. i. 512, Suppl. 421; Hack. Monogr. Androp. 202. I. imberbe, Retz. Obs. vi. 35.—Spodiopogon, Wall. Cat. 8861 (= vars. imbricatum & elatum).

Throughout the Plains and lower Hills of INDIA, from Sikkim and Bengal to Burma, and southwd. through the Deccan Peninsula. to CEYLON.—DISTRIB. China, Malaya.

Stem 1-4 ft., stout or slender, erect or decumbent at the base, simple or branched above. Leaves 4-10 in. by \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., finely acuminate, glabrous or silkily hairy, base rounded or narrowed rarely subpetiolate; sheath naked or hirsute; ligule short or 0. Spikes stout or rather slender, internodes much shorter than the spike-

lets, fragile. Spikelets \(\frac{1}{2}\) to nearly \(\frac{1}{2}\) in., pale or dark, glabrous to villous; gl. I from broadly oblong with a rounded tip to oblong-lanceolate, symmetrical or slightly curved or subdimidiate-oblong, upper \(\frac{1}{2}\) or \(\frac{1}{2}\) usually herbaceous nerved and with a narrow ciliate wing on one or both sides; II acute or acuminate; IV about \(\frac{1}{2}\) shorter than II, 3-nerved below the insertion of the slender pale awn, which is rarely twice the length of the spikelet; upper spikelet not awned, pedicel very short.—In Hohenacker's specimen of var. mangaloricum gl. IV is cleft \(\frac{1}{2}\) way down. In a small form from Salsette (Bombay) Jacquemont n. 374, the keel of gl. II is notched about the middle, winged and serrulate thence to the tip.

The following is Hackel's grouping of some of the more distinct forms of this variable plant. It has the advantage of bringing the authorities and synonyms into some order, but does not include all the definable forms, of which I have added two:—

Subsp. imberbe, Hack. l. c. 203; spikelets glabrous, except the callus. I. aristatum, Burm. Fl. Ind. t. 21, f. 3 (bad). Meoschium aristatum, Beawv. Agrost. 111—Var. imbricatum; stout, erect, ligule rather long, gl. I of sessile spikelet 2-noduled on each side, of pedicelled smooth. Meoschium imbricatum, Musro mss. Andropogon imberbis, Steud. Syn. Gram. 378. Bengal, the Khasia Hills, Ceylon (OP. 869).—Var. mangaloricum, Hack. l. c. 204: stout, erect, ligule short, gl. I of lower spikelet surmounted by a broad scarious claw 3-4-noduled on each side, IV deeply cleft. I. geniculatum, Hochst. in Hohen. Pl. Ind. Or. n. 184 (non Rosb.) Meoschium Arnottianum, Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 198. Andropogon geniculatus, Steud. l. c.—The Concan and Malabar.—Var. fallax, Hack. l. c.; stem slender, base decumbent, ligule minute, gl. I of lower spikelets 3-4-noduled on each side. Meoschium Arnottianum, Nees in Herb. Wight. n. 3077. M. monostachys, Wt. & Arn. ex Steud. l. c. 369. Andropogon monostachyus, Steud. l. c. Central India, the Deccan and Ceylon.

Subsp. barbatum, Hack. l. c. 204; spikelets more or less villous, gl. I of lower spikelet 3-4-noduled on each side, the opposite nodules sometimes united by a low ridge. I. barbatum, Rets. Obs. vi. 35; Kunth Enum. Pl. i. 513. Benth. Fl. Hongh. 425; Thwaites Enum. Pl. Zeyl. 364; Trim. Cat. Ceyl. Pl. 107. Meoschium barbatum, Beauv. Agrost. 111. Andropogon barbigerus, Steud. l. c. 376.—Var. elatum, Hack. l. c. 205; tall, branched, sheaths hirsute, ligule \(\frac{1}{2}\)—in. Meoschium elatum, Nees ex Steud. l. c. 376. M. Neesianum, Arn. ex Steud. l. c. 375. Andropogon, Esenbeckii, and elatus, Steud. l. c. 375, 376.

Subsp. Koenigii, *Hook. f.*; tall, very robust, stem as thick as a swan's quill, leaves 1-1\frac{1}{2} in. broad, spikes 3 very stout 4 in. long, spikelets \frac{1}{2} in., gl. I of lower oblong-lanceolate acute, IV shortly 2-fid lobes narrow. I. fasciculatum, *Rottler mes.*—Deccan Peninsula, *Koenig.*—Probably a distinct species.

Subsp. Rottleri, Hook. f.; stem stout much branched, spikelets 1 in. closely imbricate, gl. I of lower linear-oblong, of upper very broad broadly winged on one side nerves of both with anastomosing tips, gl. IV of lower cleft nearly to the base, awn inserted in the cleft, of upper oblong bidentate mucronate in the notch. I. barbatum, Herb. Rottler.—Probably from the Deccan. This also may be a distinct species.

2. L. rugosum, Salisb. Ic. Stirp. Rar. i. t. 1; annual, erect, leaves narrow base contracted, spikes 1-2, gl. I subdimidiately oblong obtuse very convex, coriaceous below and closely transversely ridged membranous above, IV cleft to below the middle awn geniculately inserted at the cleft dorsally lobes lanceolate. Gærin. f. Fruct. Suppl. i. t. 181; Roæb. Fl. Ind. i. t. 320; Hack. Monogr. Androp. 206; Thwaites Enum. Pl. Zeyl. 364; Trim. Cat. Ceyl. Pl. 107; Duthie Grass. N.W. Ind. 18, Fodd. Grass. N. Ind. 31; Rendle in Journ. Bot. xxxii. (1894) 103. I. Colladoa, Spreng. Syst. i. 298. I. corrugatum, Herb. Ham. in Wall. Cat. n. 8864 E. I. Royleanum, Mig. Flr. Ind. Bat. iii. 498; Duthie Grass. N. W. Ind. 18. I. segetum, Trin. in Mem. Acad. Petereb. Ser. vi. ii. (1883) 294. Meoschium Griffithii, Ness & Arn. in Ann. & Mag. Nat. Hist. i. (1838) 284. M. Arnottianum, Ness,

elegans, Arn. & Nees, rugosum, Nees, & Wightianum, Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 199, in Pl. Meyen. 200. M. Royleanum, Nees ex Steud. Syn. Gram. 375. M. rugosum, Wall. Cat. n. 8864. M. Wightii, Nees in Wight Cat. n. 1719. Andropogon Arnottianus, Griffithsis, segetum & Tong-dong, Steud. l.c. 375, 376. Apluda rugosa, Herb. Russ. ex Wall. l.c. 8864. A. Collados distactya, Cav. Io. 37, t. 480.

Throughout INDIA from the Lower Himalaya southwd. to Burma, and the Malay

Peninsula, Andaman Islds., and CEYLON.—DISTRIB. China, Malaya.

Stems 1-2 ft., tufted, nodes glabrous or puberulous. Leaves 4-10 in.; ligule short. Spikes 1-3 in., pale yellow; joints = \frac{3}{2} spikelets, very stout, ciliate. Spikelets \frac{1}{2} spikelets

3. I. magnum, Rendle in Journ. Bot. xxxii. (1894) 102; tall, stout, leaves linear-lanceolate from a narrow base, spikes 2 appressed 4-7 in. nearly glabrous, gl. I of sessile spikelet oblong-lanceolate very coriaceous and deeply transversely channelled below the middle thinner above and 3-5-nerved with one keel narrowly winged, IV ovate-lanceolate entire apiculate awn 0,

SINGAPORE; at Blakan Mate, Feilding.

Stem 6 ft., branched above; branches slender, nodes hairy. Leaves 12-20 in., finely acuminate, glabrous above, sparsely hairy beneath; sheaths above villous and scabrid; ligule \(\frac{1}{2}\)-\frac{1}{2}\) in., 2-auricled. Spikes stout, pale; joints 3-gonous, ciliolate on the outer angle, =\frac{1}{2}\) shorter than the sessile spikelet, tips very shortly bearded; pedicel of upper spikelet very ahert stout. Seastle spikelets \(\frac{1}{2}\) in., oblong, convex, pale yellowish polished, tumid between the transverse channels; II coriaceous, acutely keeled, margins incurved; III lanceolate, acuminate, hyaline, 3-nerved, puleate, palea has long 2-nerved; IV rather shorter, hyaline, ovate-lanceolate, 3-nerved; palea as long, narrowly lanceolate, 2-nerved. Pedicelled spikelet as long as the 'sessile, obliquely convolute, inner margin with 2-3 nodules, outer narrowly winged.

4. Z. molle, Hook. f.; tall, stout, branched, leaves sessile, spikes 1-2 stout densely silkily villous with white hairs, joints broad half as long at the spikelets, gl. I broadly ovate-oblong obtuse smooth dorsally villous all over many-nerved, II obtuse silky keel narrowly winged from the middle upwards, IV shorter cleft to the middle, lobes acuminate ciliate, awn geniculately inserted at the cleft. I. aristatum var. intermedium, Hack. mss.

The CONCAN? Herb. Dalzell. CENTRAL PROVINCES; Chanda district, Duthic. Stem 3-4 ft., soft, solid, quite smooth, leafy. Leaves 6-10 by \(\frac{1}{2}\) in., finely accuminate, base rounded and cordate, sparsely hairy on both surfaces; sheaths 4-6 in., smooth, glabrous or sparingly hairy above, mouth villous. Spikes axillary and terminal, 3-5 in.; joints stout; 3-gonous or concavo-convex, ciliate, tips trancate. Spikelets \(\frac{1}{2}\) in.; callus very short, broad; gl. I thinly coriaceous, margins narrowly incurved obscurely waved at the base; II chartaceous, wing ciliclate, margins ciliate; III hyaline, ovate, obtuse, 3-nerved, ciliate; palea as long, narrower, obtuse, 2-nerved; IV about \(\frac{1}{2}\) shorter than III, awn 2-3 times as long as the gls., golden yellow and shining with a brown column; palea like that of III but smaller. Upper spikelet smaller than the lower, awnless, pedicel = \(\frac{1}{2}\) of lower spikelet.

- §§ Pedicel of upper spikelet \ the length of the lower spikelet or more.
- 5. **I.** diplopogon, Hook.f.; annual, branching upwards, leaves lanceolate from a narrow base, upper sheaths spathiform, spikes 2 pale, peduncle flexuous, joints dorsally ciliate, sessile spikelets $\frac{1}{6} \frac{1}{6}$ in., gl. I oblong 2-cuspidate glabrous shining, II awned 3-nerved lateral nerves pectinately ciliate with stiff hairs above the middle, IV very short 2-fid lobes acute eciliate awned in the cleft.

BOMBAY; near Bhorkus, Woodrow.

Stems 12-18 in. or more, branched from the base and upwards, smooth, stout or slender, internodes long, nodes glabrous. Leaves 4-6 by \(\frac{1}{4}\)-\(\frac{1}{3}\) in., acuminate, narrowed from below the middle to the base, dark green, rather shining above, margins smooth, nerves 3-4 pairs and midrib very slender; sheath glabrous, of upper leaves open; ligule very short, glabrous. Peduncles many from the upper spathiform sheaths, solitary, filiform; spathes 1-3 in., compressed, lanceolate. Spikes 1-1\(\frac{1}{2}\) in., compressed; pedicelled spikelets divergent; joints and pedicels = \(\frac{1}{2}\) the lower spikelets or longer, subclavate, dorsally rounded, ventrally concave. Sessile spikelets white; gl. I nerves obscure, margins narrowly incurved; II dorsally smooth, awn as long as itself; III linear-oblong, 1-nerved, eciliate; IV 3-nerved, awn \(\frac{1}{2}\) in. capillary, palea very small, oblong. Pedicelled spikelets often imperfect, not awned; gl. I elliptic, 2-cuspidate, green, margins white; II acuminate.

6. I. Kingii, Hook. f.; annual, leaves ovate-lanceolate base rounded or subcordate, hairy beneath, sheaths of uppermost spathiform, spikes 2 ovate pale villous, joints and pedicels very stout densely ciliate tops 3-lobed, sessile spikelet \(\frac{1}{6}-\frac{1}{2}\) in., gl. I oblong or oblong-lanceolate 2-cuspidate or 2-aristulate dorsally glabrous shining, sides bulging at about the lower keels ciliate above, II awned dorsally rounded with a broad pencil of stiff hairs on the upper third, IV 2-fid lobes stoutly awned between the lobes.

RAJPOOTANA: Mt. Aboo, King.

Stem 10-12 in., ascending, glabrous. Leaves 1-2 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., acuminate, rather thin, margins scaberulous, midrib and nerves very slender; sheaths lax, upper open, glabrous; ligule short, membranous. Peduncks sheathed, sometimes up to the spikes, slender. Spikes 2 in.; joints shining. Sessile spikelets with a short rounded bearded callus; keels of gl. I minutely scaberulous; II scabrid, tip 2-toothed; III lanceolate 1-nerved; IV much shorter, 3-nerved, lobes triangular-ovate, eciliate; palea about as long, ovate-lanceolate, 2-nerved, eciliate; awn about 1 in. long. Pedicelled spikelets variable, much smaller; gl. I elliptic, acute, many-nerved, flat, emargins not incurved; II shortly awned, dorsally nearly naked.

7. L. augustifolium, Hack. Monogr. Androp. 241; base of stem woolly, leaves long narrow rigid subpungent, spikes 2-4 on axillary and terminal filiform pedunoles, gl. I of sessile spikelet lanceolate 2-3-toothed dorsally convex with a tuft of hairs strongly 3-nerved margins not inflexed, II lanceolate 2-toothed aristulate, IV linear entire or 2-toothed shortly awned. Oliver in Hook. Ic. Pl. t. 1773; Kew Bulletin, 1888, 157. I. sparteum, Ham. ex Wall. Cat. n. 8845. Spodiopegon augustifolius, Trin. in Mem Acad. Petersb. Ser. vi. ii. (1833) 300, Sp. Gram. Ic. t. 336. S. laniger, Nees in Royle Ill. Himal. Pl. 416; Sleud. Syn. Gram. 373. S. notopogon, Nees ex Steud. l. c. Pollinia eriopoda, Hance in Journ. Bot. iv. (1866) 173; Dyer in Journ. Linn. Soc. xx. (1883) 409. Andropogon binatus, Retz. Obs. vi. 21. A. involutus, notopogon & obvallatus, Steud. l. c.—Eriantho affine, Wall. Cat. n. 8845.

LOWER HIMALAYA; from Kashmir to Sikkim, ascending to 7000 ft. in Garwhal, Duthic. The PANJAB. RAJPOOTANA, on Mt. Aboo. The SATPURA HILLS. BRHAE

On Parusn th. Centeal India. (Cult. in Bengal, Kurz.) - Distere, Affghanistan,

China. Philippines.

Stems 2-3 ft., tufted, sparingly branched, slender, grooved on one side, smooth. I.eaves 1-2 ft. by $\frac{1}{10}$ - $\frac{1}{6}$ in., concave or convolute, base obtuse fimbriate, margins scaberulous; sheath glabrous, old basal forming with the wool a thickened mass; ligule a ridge of hairs. Spikes 1-2 in., close together or placed apart, erect, golden or rusty villous; joints and pedicels = } the lower spikelet, slender, shortly ciliate. bearded at the base. Spikelets 1-1 in , lanceolate, callus hairs short; gl. I subchartaceous, margined with long rufous hairs; II rather longer, 3-5-nerved, ciliate, keel bearded below; III oblong, obtuse, tip ciliate, nerveless, paleate; palea entire or 2-lobed, tip ciliate; IV = II, 1-nerved, awn as long as the spikelet; palea short, ovate, obtuse, tip fimbriate. Pedicelled spikelets like the sessile,-Hackel points out that except for the inflorescence this is more a Spodiopogon or Pollinia than an Ischæmum, and should perhaps form a genus. The woolly stem-base recalls Pollinia veluting and pheothrix.

8. I. pilosum, Hack, Monogr. Androp. 240; tall, robust, leaves narrow, spikes 2-6 villous, gl. I of sessile spikelet lanceolate bicuspidate translucent dorsally flat or depressed hairy 6-nerved keels scabrid and ciliate, II longer keel ciliate above. IV = III oblong-lanceolate 2-fid, awn short slender inserted between the lanceolate lobes. Duthic Fodd. Grass. N. Ind. 31; Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 199. Spodiopogon pilosus, Nees ex Steud. Syn. Gram. 373; Wight Cat. n. 1692. Andropogon pilifer, Steud. l.c. A. pilosus, Klein ex Willd. Sp. Pl. iv. 920.—Andropogon, Wall. Cat. n. 8817.

AJMEER; at Neemuch, Jacquemont. CENTRAL PROVINCES, Duthie. The DECCAN

PENINSULA, Heyne, &c.

Stem very stout, extensively oreeping; stolons sheathed; branches 2-3 ft., much divided at the base, nodes glabrous. Leaves 6-12 in., flat or convolute, often wiry, coriaceous, glaucous, finely acuminate, glabrous, base and mouth of sheath bearded; ligule membranous, rounded. Spikes fascicled, 1-11 in., yellow or brownish, rachis hairy, joints and pedicels slender, compressed, subclavate, shorter than the sessile spikelets, sparsely ciliate. Sessi'e spikelets 1 in.; callus minute, bearded with long hairs; gl. I chartaceous, narrowed from the middle upwards, dorsally hairy, nerves anastomosing, margins inflexed from base to tip; II rather longer, chartaceous, laterally compressed, acuminate, 5-nerved; III linear-oblong, obtuse, ciliate above, pulcate, male, palea glabrous; IV = III, 3-nerved, lobes ciliolate, awn variable in length; palea narrow or broad, ciliate. Peduncled spikelets smaller but like the sessile, or imperfect, sometimes reduced to a single gl.

- tt Leaves hastate or cordate at the base, often petioled.
- § Pedicel of upper spikelet not \ the length of the lower spikelet.
- 9. I. semisagittatum, Roxb. Fl. Ind. i. 320; annual, slender, prostrate below, leaves oblong- or linear-lanceolate from a broad cordate or sagittate base, spikes 2 villous or glabrescent, joints very short and stout, gl. I of sessile spikelet oblong obtuse flat glabrous transversely undulate or ridged or margins nodulose, II lanceolate acuminate villous or pubescent, IV cleft to the middle or higher, awn dorsal below the cleft. Kunth Enum. Pl. i. 518; Hack. Monogr. Androp. 208; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 197. I. conjugatum, Thw. Enum. Pl. Zeyl. 365; Trim. Cat. Ceyl. Pl. 107; Hack. l.c. 205 (non Roxb.). Meoschium semisagittatum, Schult. Mant. ii. 435. Spodiopogon semisagittatus, Voigt Hort. Suburb. Calc. 706. Andropogon semisagittatus, Steud. Syn. Gram. 376.

The DECCAN, CONCAN, and CANARA, Stocks, Talbot. BENGAL. Roaburgh. CELLON, Thwaites (C.P. 3263).

Stem 12-24 in., slender, flaccid, leafy, pale, internodes long, nodes glabrous or hairy. Leaves 3-5 in., finely acuminate, flaccid, 3-5-nerved, glabrous or sparsely hairy, margins smooth, costa slender, lower with a filiform petiole ½-1½ in. long; sheaths long, upper often ventricose lower with a filiform petiole ½-1½ in. long; sheaths long, upper often ventricose and open, margius and ligule ciliate. Spikes 1-2½ in., more or less villous with white or grey hairs; joints trigonous, clavate. Sessile spikelets ½-½ in., gl. I thin, green, dorsally villous, margins narrowly inflexed cliefly below the middle; II lanceolate, acuminate, dorsally rounded; III lanceolate, 1-nerved, paleate; IV glabrous or lobes ciliate, 3-nerved, awn ½-½ in.; palea longer than the gl. Pedvecled spikelets very shortly broadly pedicelled; gl. I 7-9-nerved, winged above on one side.—I have not seen Huegel's specimens which alone Hackel describes, and for which no babitat is given. The leaf-margins of the specimens I have seen are scarcely "scaberrimæ." Hackel has two vars.: a. genuinum, spikelets glabrous, joints dorsally smooth; β. dasyanthum, gl. I at least of upper spikelets appressedly villous, joints scabrid with hairy margins and dorsal keel.

Var. glabrescens; spikes more slender, joints shortly villous, gl. I shining glabrous transversely undulate below the middle, IV bicuspidate, awn sometimes inserted half-way between the base and sinus, or bipartite and awn geniculately inserted at

the cleft.

10. **L. conjugatum**, Roxb. Fl. Ind. i. 321; annual, prostrate below, leaves short base hastate or broadly deeply cordate, spikes 2 short villous, joints very short ciliate, gl. I of sessile spikelet oblong obtuse flat 2-toothed villous even or lower margins obscurely nodose, II lanceolate acuminate puberulous, IV cleft to about the middle, awn dorsally inserted at or below the cleft. Kunth Enum. Pl. i. 513; Hack. Monogr. Androp. 205. Spodiopogon conjugatus, Voigt Hort. Suburb. Calc. 706. Andropogon cordatifolius, Steud. Syn. Gram. 376.

BENGAL; near Calcutta, Roxburgh. The Concan, Stocks. CEYLON (naturalized) Trimen.

Stem spreading from the root and creeping, then geniculately ascending, 12-18 in. high, slender, stiff, purplish, repeatedly branching upwards. Leaves 1-1½ in., acuminate, broadest at the base, rather rigid, striate, lower petioled; sheath of the upper ventricose and often open; ligule short, glabrous. Spikes 1-1½ in., seasile; joints quadrately clavate, plano-convex. Spikelets ½ in., pale; gl. I more or less villous from below or above the middle to nearly the top, margins narrowly inflexed not winged, upper half often greener; II strongly keeled, puberulous; III paleate; IV awn slender about twice as long as the spikelet. Pedicelled spikelets subsessile, almost awnless; gl. I as in the sessile.—I have seen only Concan specimens, they agree with Roxburgh's character and figure, except in the nodes being hardly villous.

§§ Pedicel of upper spikelets $= \frac{1}{8}$ the length of the lower spikelet, or longer.

11. **I. commutatum**, Hack. Monogr. Androp. 209; slender, prostrate below, leaves short cordate lower petioled, spikes 2, gl. I of sessile spikelet oblong obtuse or acute 2-toothed flat dorsally undulate tip faintly winged margins obscurely nodulose, II acuminate keeled, IV cleft to the middle, awn inserted by a broad base between the ciliate lobes. Trim. Cat. Ceyl. Pl. 107. I. semisagittatum, Thw. Enum. Pl. Zeyl. 365 (non Roxb.).

NILGHIRI HILLS; Concor, alt. 7000 ft., Clarke. CEYLON; Ambagamowa district, Thwaites (C.P. n. 2625).

Stem 6-12 in., branching upwards from a decumbent base, nodes glabrous. Leaves 1-3 in., linear-lanceolate, acute, softly hairy, margins scabrid; sheath smooth or hairy and keeled above; ligule rounded. Spikes 1-1\frac{1}{2} in.; joints = about \frac{1}{2} the sessile spikelet, shortly ciliate. Sessile spikelets \frac{1}{2}-\frac{1}{2} in., green or dark-colrd.; callus

hearded; gl. I coriaceous, keels glabrous narrowly winged above; II ovate-lanceolate, keel obtuse smooth; III lanceolate, 3-nerved, paleate; IV shorter, oblong, glabrous, swu ½-¾ in., palea minute. Psdicelled spikelets smaller, awnless; gl. I 5-7-nerved, winged on one side.

12. **I. impressum**, Hack. Monogr. Androp. 210; slender, prostrate below, leaves ovate- or oblong-lanceolate cordate lower narrower petioled, spikes 2 villous, gl. I of sessile spikelets linear-oblong flat dorsally broadly irregularly depressed with shallow subsemilunar pits in the lower $\frac{3}{2}$ above it winged and 2-cuspidate, II dorsally rounded with a median gibbosity and an auricle-like wing above it, IV cleft to above the middle, awn short geniculately inserted at the cleft.

INDIA, Huegel. The CONCAN & Herb. Dalzell.

Stem 4-8 in., quite glabrous, branching upwards. Leaves 2-3 in., upper \$\frac{1}{2}\$ in. broad, sparsely hairy beneath, margins thickened, scabervlous, sometimes crenulate; sheath compressed, glabrous; ligule oblong. Spikes yellow; joints and pedicels stout, clavate, ciliate with rigid hairs, forked at the top. Sessile spikelets \$\frac{1}{2} - \frac{1}{2}\$ in., shining; callus short, broad, bearded; gl. I narrowed and margins subnodulose at the base, wings crose; II obtuse, chartaceous, ciliate; III oblong-lanceolate, hyaline, 3-nerved, ciliate; IV much shorter, glabrous; awn 1-1\frac{1}{2}\$ in., with very stout column and golden tip; palea oblong, obtuse, glabrous. Pedicelled spikelets smaller than the sessile; gl. I obtuse, glabrous, many-nerved, winged on one margin; II 7-nerved; IV mucronate.—I have seen only a fragmentary specimen in Dalzell's Herbarium. The sculpturing of gl. I probably varies.

13. Z. Feildingianum, Rendle in Journ. Bot. xxii. (1894) 101; stem robust branched above, leaves lanceolate cordate, spikes 2 appressed silkily hairy of gl. I, sessile spikelets broadly oblanceolate flat coriaceous and glabrous below the middle hairy above with 6-8 nerves anastomosing at their tips, keels scaberulous, II 6-nerved keeled aristulate, IV deeply 2-fid, awn inserted between the broad obtuse lobes.

MALAY PENINBULA; Mt. Ophir, Feilding.

- Upper leaves 4-5 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., narrowed from the base to the acuminate tip, rigid, pubescent beneath, 16-20-nerved; sheath pubescent; ligule short, truncate. Spikes 3-3\(\frac{1}{2}\) in., erect, fragile, peduncle villous towards the tip; joints and pedicels stout, trigonous, about \(\frac{1}{2}\)-\(\frac{1}{2}\) shorter than the spikelet, angles and excised hollow tips long-ciliate. Sessite spikelets \(\frac{1}{2}\) in., narrowed to the base; callus cuneiform, densely bearded; gl. I obtuse or 2-toothed, keels very narrowly wingeds towards the tip; II rather longer than I, scabrid above and narrowed into the short recurved awn; III ovate-oblong, obtuse, hyaline, faintly 3-nerved; palea as long, lanceolate, subchartaceous, with broad rounded hyaline wings; IV hyaline, subscaberulous, awn about \(\frac{1}{2}\) in.; palea as long as the gl., lanceolate, 2-nerved. Pedicelled spikelets smaller, keels of gl. I winged on one side; IV not awned.
- ** Margins of gl. I of sessile spikelet broadly incurved below the middle.
 - † Keel of gl. II winged above the middle (see also I. murinum).
- 14. **I. muticum**, Linn. Sp. Pl. 1049; glabrous, creeping, branches erect leafy, leaves ovate to lanceolate rigid, spikes 2 short stout glabrous, gl. I of sessile spikelet oblong 2-toothed smooth keels narrowly winged above, II acuminate keel winged above the middle, IV oblong shortly 2-fid shortly awned between the acute ciliate lobes. Gentr. f. Fruct. Suppl. 1, t. 181; Kunth Enum. Pl. i. 512; Hack. Monogr. Androp. 212; Wall. Cat. n. 8865; Wight Cat. n. 1716, Herb. n. 3078; Thw. Enum. Pl.

Zeyl. 364; Trim. Cat. Ceyl. Pl. 107; Benth. Fl. Austral. vii. 520. I. glabratum, Presl Rel. Hænk. i. 328. I. repens, Roxb. Fl. Ind. i. 323; Wight Cat. n. 1715. Andropogon muticus, polymorphus, relictus & repens, Steud. Syn. Gram. 374, 375, 377, 374.

The DECCAN PENINSULA, from Canara southwd. BURMA, the MALAYAN PENINSULA and LACCADINE ISLDS. CEYLON, common.—Distrib. China, Malaya, Australia.

Rootstock very stout, creeping for several feet in sand; branches 2-10 in., stout, usually leafy up to the spike; nodes glabrous. Leaves 1-6 in., rarely more, sessile or subsessile, flat, stiff, base rounded or cordate, brown when dry; sheath smooth; ligule obscure. Spikes 1-1½ in., joints and pedicels stout, 3-gonous, = about half the sessile spikelet, truncate, shortly ciliate. Sessile spikelets $\frac{1}{2}-\frac{1}{6}$ in., glabrous, callus very large, smooth; gl. I acute, thickly coriaceous, shiuing, obscurely many-nerved, dorsally ciliate above the middle, margins below broadly incurved; II larger, rigid, glabrous, 5-nerved; III oblong, obtuse, glabrous, palea with a narrow hyaline wing; IV = II, chartaceous, convolute, 5-nerved; palea oblong-lanceolate, keels ciliate. Pedicelled spikelets laterally compressed; gl. I with the margin on one side inflexed and broadly winged, concave, hairy; gl. IV usually bisexual.

15. **I. Lisboss**, Hook. f.; stem creeping below, leaves oblong acute and open sheaths villously tomentose, spikes 2 softly tomentose, gl. I of sessile spikelets oblong 2-fid convex keels with broad auricular ciliate wings, II coriaceous scabridly awned keel winged above the middle, IV oblong, obtusely 2-lobed, awn slender inserted between the rounded lobes.

NORTH CANARA, Lisboa.

Stem very stout, rooting at the thickened nodes; branches ascending 8-14 in., glabrous. Leaves on the creeping stem 1-2 in., closely imbricating in two series, the blades reflexed at right angles to the erect short open sheaths, softly tomentose on both surfaces; lower sheaths \frac{1}{2}-1 in., villous; lightle short, bearded with very long hairs. Spikes 2 in., joints and pedicels about half as long as the spikelets, stout, concavo-convex, shortly villous, truncate. Sessile spikelets \frac{1}{2} in., callus very large, glabrous; gl. I thickly coriaceous, dorsally convex, ciliate above the middle, margins broadly incurved below the middle; It rather longer, rigid, dorsally rounded below the wing; III ovate-oblong, obtuse, margins ciliate, paleate, male; palea chartaceous, obovate, 2-nerved, nerves meeting at the tip with very broad hyaline wings above the middle; IV = \frac{3}{2} II, 3-nerved below the middle, awn about twice as long as \frac{2}{2} the spikelet; palea lanceolate, nerves ciliate. Pedicelled spikelets laterally compressed; gl. I convex, broadly winged, villous; IV shortly awned or awnless.—The habit of the only good specimen I have seen is very peculiar.

16. Z. ciliare, Retz. Obs. vi. 36; erect or decumbent below, leaves linear, spikes 2-3 villous, gl. I oblong or obovate-oblong conver 5-7-nerved 2-lobed or 2-fid from the keels ending in 2 terminal wings, II acuminate or awned dorsally rounded keeled and winged above the middle, IV obovate-oblong cleft to the middle awned in the cleft. Kunth Enum. Pl. i. 513 (excl. syn.); Hack. Monogr. Androp. 225; Trim. Cat. Ceyl. Pl. 107; Wight Cat. n. 2322. Duthie Fodd Grass. N. Ind. 30; Benth. Fl. Austral. vii. 520 (var.? podostachyum). I. aristatum, Willd. Sp. Pl. iv. 939; Roxb. Fl. Ind. i. 319. I. barbatum, Herb. Ham. ex Wall. Cat. n. 8860 A. I. geniculatum, Roxb. Fl. Ind. i. 322. I. scrobiculatum, Wight & Arn. ex Steud? l. c. 373. I. tenue, Herb. Ham. ex Wall. Cat. n. 8866. Spodiopogon ciliaris, Nees ex Steud. Nom. Ed. II. ii. 625; Wight Cat. n. 1693. S. obliquivalvis, Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 185, Thw.

Enum. Pl. Zeyl. 365; Wight Cat. n. 1693; Wall. Cat. n. 8588; Duthie Gruss. N.W. Ind. 16; Benth. Fl. Hongk. 426. S. scrobiculatus, Nees in Wight Cat. n. 1694, & zeylanicus, Nees ex Steud. l. c. 373, 377. S. villosus. Nees in Hook. & Arn. Bot. Beech. Voy. 242. Andropogon bifidus, incortus, Macresi, simillimus, patenti-villosus, & Retzii, Steud. l. c. 373-377. A. Macresi, Steud. l. c. 377. A. malacophyllus, Hochst. ex Steud. l. c. 372.—Spodiopogon, Wall. Cat. n. 8859, 8860, 8862.

BENGAL and the LOWER HIMALAYA, from Nepal to Assam, SILHET and BURMA. and southwd. to Travancore, the Laccadine Islds, Alcock, and Gt. Cocos

ISLD., Prain. CEYLON.—DISTRIB. China, Malaya, Australia.

Stem 6 in. 2 ft., stout or slender, tufted, leafy, sometimes creeping; nodes glabrous or bearded. Leaves 2-6 in., glabrous pubescent or villous; sheath glabrous or hirsute; ligule short, ciliate. Spikes 11-2 in., rather stout; joints and pedicels = about } the spikelets, straight or incurved, ciliate, truncate. Spik lets 1-1 in.; gl. I polished, glabrous or vilious, sometimes pitted, upper part scrobiculate or not, terminal wings erose or ciliolate, scaberulous, margins broadly inflexed below; II glabrous, or dorsally ciliate, aristulate; III oblong, 1-3-nerved, ciliate, paleate, male; palea with a chartaceous lanceolate centre, and broad hyaline wings; IV glabrous or ciliolate, awn very slender, about twice as long as the spikelet. Pedicelled spikelets rather smaller than the sessile, gl. I acute.—A very common and variable plant, of which Hackel has 3 varieties and 4 Indian subvarieties as follows :--

Var. a. genuinum, Hack.; joints and pedicels diverging at the base, spikelets continuous with the callus, gl. IV of pedicelled spikelets usually awned .-1, prorepens, stem creeping, branches erect, gl. I not scrobiculate; 2, scrobiculatum, habit of a, spikelets smaller, gl. I scrobiculate. - 3, malacophyllum, tall, gl. I broadly winged at the tip, keel of II ciliate. -4, villosum; leaves and sheaths villous.

Var. B. Wallichii, Hack.; tall, joints and pedicels not divergent at the base, sessile spikelet suddenly constricted at the long bearded callus, gl. IV of pedicelled spikelet imperfectly awned.

Var. y. longipilum, Hack.; joint and pedicels as in B. Spikelets glabrous with

a long bearded callus, pedicelled spikelet long-awned.

17. I. heterotrichum, Hack. Monogr. Androp. 220; stem prostrate then ascending, leaves linear-lanceolate from a rounded base, spikes 2 stout erect, gl. I of sessile spikelet rhombic-lanceolate upper part triangular. acute dorsally smooth glabrous 4-nerved tip membranous 2-toothed keels broadly winged, II subcoriaceous keel winged above, III ovate 3-nerved, IV shorter broadly oblong shortly 2-toothed awned in the notch. PAndropogon comorensis, Steud. Syn. Gram. 431.

NICOBAR ISLDS., Jelinek .- DISTRIB. Madagascar, Seychelles.

Stem about 20 in. high, slender, compressed, quite glabrous. Leaves 2-6 by 1-11 in., glabrous or base fimbriate, margins undulate, scabrid, base contracted at the junction with the compressed loose keeled sheath; ligule very short, truncate, ciliate. Spikes 2-21 in., erect, compressed, joints and pedicels half as long as the spikelet, bearded. Sessile spikelet in.; callus bearded at the base; gl. I tip membranous 2-toothed, 4-nerved above, margins involute below the middle; II mucronulate, margins ciliolate; III shorter, chartaceous, orate, acuminate, 3-nerved ciliate, paleate; IV short, ciliolate, awn more or less imperfect confluent with the gl. Pedicelled spikelets \(\frac{1}{2} \) in., gl. I winged from below the middle upwards, 7-nerved glabrous.—Descript. from Hackel. In a Seychelle Isld. specimen which I have examined the keel of gl. II is not dorsally winged, and gl. IV is byaline 5-perved with lanceolate acuminate ciliate lobes.

- ++ Keel of gl. II. not winged (or winged in I. murinum).
- 18. I. murinum, Forst. Fl. Ins. Austr. Prodr. 73; slender, erect or prostrate below, much branched, leaves narrowly linear, spikes 2-3 slender villous, gl. I of sessile spikelets oblong acuminate 2-cuspidate or 2-mucronate faintly 5-7-nerved, keels rounded not winged, II long-beaked awned, IV cleft to the middle, awn long stout inserted between the large eciliate lobes. Kunth Enum. Pl. i. 571, Suppl. 419; Hack. Monogr. Androp. 223. Andropogon murinus, Steud. Syn. Gram. 377.—Spodiopogon, sp. 9, Herb. Ind. Or. Hook. f. & T.

MYSORE or the CARNATIC, G. Thomson.—DISTRB. Tanna Isld. (New Caledonia). Stems 1-2 ft., very slender, erect or prostrate and geniculate at the base, branching upwards; nodes bearded. Leaves 2-4 by 1 -1 in., sessile, flaccid, setaceously acuminate, narrowed to the rounded base, midrib vanishing upwards; sheath scaberulous; ligule ohlong, membranous. Spikes 1-1; in., often sheathed by the upper leaves, drying red-brown; joints and pedicels = } spikelet, rather slender, trigonous, long-ciliate, tops 3-toothed concave. Sessile spikelets & in., red-brown, callus long, stout, unilaterally stiffly bearded; gl. I dorsally polished, sparsely ciliate with long stiff hairs above the middle, margins ventricosely incurved below the middle; II longer than I, inserted below it on the callus, dorsally convex, faintly 3-nerved, beak 2-toothed with a long or short very slender awn, keel above shortly winged or not; III male, oblong-lanceolate, acute, 1-nerved, margins incurved; palea as long 2-nerved, nerves convergent in the tip scaberulous with broad hyaline wings, IV = II, female, glabrous, awn dilating at its insertion into a semilunar ridge: palea as long as the gl., ovate, lanceolate, 2-nerved at the base. Styles very long, stigmas short. Pedicelled spikelets nearly as the sessile.—This species is contained in an extensive Herbarium formed by G. Thomson, Esq. (brother of the late Superintendent of the Calcutta Botanical Gardens). The flowers in each spikelet are strictly unisexual.

19. **I. hirtum**, Hack. Monogr. Androp. 228; stout, suberect, leaves long, spikes few or many, gl. I of sessile spikelet lanceolate acuminate or 2-cuspidate 6-9-nerved villous above or glabrate, II aristulate dorsally rounded, IV oblong acutely 2-lobed ciliate awned in the cleft. I. rivale, Hack. l.c. Spodiopogon rivalis, Thw. mss.

BENGAL, BEHAE and the KHASIA HILLS, alt. 4-6000 ft. CHOTA NAGPORE, and CENTRAL INDIA. NILGHIEI HILLS, alt. 5000 ft. CEYLON; Mateke East, Beckett.

Stem 2-3 ft., nodes glabrous or sparsely bearded. Leaves 4-8 by ½-1 in., finely acuminate, base narrowed or rounded, glabrous or sheath sparsely hairy; ligule short, ciliate. Spikes 2-20, 1-4 in., joints and pedicels subequal, rather elender, trigonous, ciliate. Spikelets ½-½ in.; callus long-bearded; gl. I more or less herbaceous, 6-9-nerved above the middle, margins broadly incurved below; II inserted below I on the callus, sometimes 2-dentate, 3-5-nerved, villous or glabrate; III oblong-lanceolate, acuminate, faintly 3-nerved, ciliate, paleate, male or neuter; palea oblong, centre chartaceous with hyaline ciliate wings; IV ciliolate; awn very elender, ½-½ in., confluent with the gl., base semilunar; palea as long as the gl. Pedicelled spikelets gl. I awned, narrowly winged or not.—The Nilghiri plant is a very tall stout form, with long leaves, and a corymbiform fascicle of more than 20 spikes, its gl. IV is more deeply cleft, and the awn is not produced downwards in the body of the gl.

Hackel, who was not aware how widely spread and variable a species it is, keeps I. hirtum and rivale as distinct species, thus distinguished:—I. hirtum, leaves hirsute on both surfaces, spikes 2-3, gl. I of sessile spikelet entirely chartaceo-herbaceous with 7-9 percurrent nerves, densely hirsute in the upper half.—Khasia Hills. I.

rivale, leaves quite glabrous, spikes about 4, gl. I. chartaceous 6-7-nerved in the upper glabrous with the margins sparsely hairy.—Ceylon.

20. **I. timorense**, Kunth Revis. Gram. i. 369, t. 98, Enum. Pl. i. 512, Suppl. 419; slender, decumbent below, leaves sessile and petioled, spikes 2-3 sparingly villous, gl. I ovate or ovate-lanceolate acuminate bicuspidate 5-9-nerved base ventricose, II longer acuminate or aristulate dorsally rounded, IV short 2-lobed awn in the cleft very slender. Hack. Monogr. Androp. 229; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 198. I. tenellum, Roxb. Fl. Ind. i. 323. Spodiopogon Blumii, Nees ex Steud. Syn. Gram. 373. Andropogon Asthenos, Steud. l. c. A. timorensis, Steud. l. c. 376.—Ischæmum n. 4. Griff. Notul. 91, Ic. Pl. Asiat. t. 148, f. 1.—Spodiopogon, Wall. Cat. n. 8863.

BENGAL, Rowburgh, SILHET, Clarke. CHITTAGONG, J. D. H. & T. T. BURMA, Wallich. CANABA and the CENTRAL PROVINCES, Duthie, &c. MALAYAN PENINEULA. CEYLON, Thwaites (C.P. 968, 3168).—DISTRIB. Malay and Pacific Islds.

Stem 6-18 in., branched and straggling, nodes glabrous or sparingly bearded. Leares 1-4 in., linear-lanceolate, acuminate, glabrous or sparingly hairy, base of upper rounded, of lower narrowed; sheath lax, mouth hairy; ligule obscure. Spikes 1-2 in., rather slender; joints and pedicels about half as long as the spikelet, nearly equal, shortly ciliate. Sessile spikelets \(\frac{1}{10} - \frac{1}{3} \) in., greenish, or with green nerves; callus narrow, long-bearded; gl. I margins broadly involute below, subsuricled, dorsally convex, polished, nerves strong; II recurved, 3-5 nerved, tip 2-toothed, dorsally usually ciliate; III lanceolate, paleate, palea linear-oblong; IV glabrous, awn very slender shortly exserted. Pedicelled spikelets like the sessile, awned.—A very variable plant, in the form of the leaves especially. Hackel gives four varieties founded on inconstant characters of the leaves and length of the awn. I have little doubt that I. tenellum, Roxb., is I. timorense. Hackel doubtfully refers it to ciliare, of which it has none of the marked characters.

Sect. II. SEHIMA (Forsk. Gen.). Spikes solitary. Gl. I of sessile spikelet deeply channelled or depressed along the median line (except I. notatum).

21. I. laxum, Br. Prodr. 205; perennial, leaves linear scaberulous base narrowed, gl. I of sessile spikelet linear-oblong glabrous 2-cuspidate with a broad membranous translucent depression bounded by two strong flexuous submarginal nerves, nodose in the upper half, II awned, \overrightarrow{IV} , 2-fid awned between the lanceolate ciliate lobes, Hack. Monogr. Androp. 243; Trim. Cat. Ceyl. Pl. 107; Duthie Fodd. Grass. N.W. Ind. 31, t. 58; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 199; Benth. Fl. Austral. vii. 522. I. inscalptum, Hochst. in Flora (1844) 247; A. Rich. Tent. Fl. Abyss. ii. 472. I. macrostachyum, Hochst. ex A. Rich. l. c. I. montanum, Herb. Russ. ex Wall. Cat. n. 8818 A. I. nervosum, Thw. Enum. Pl. Zeyl. 365. I. Sehima, Spreng. Syst. Veg. i. 298. Hologamium nervosum, Nees in Edinb. N. Phil. Journ. xviii. (1835) 185; Wight Cat. n. 1689. Sehima ischemoider, Forsk. Fl. Æg. Arab. 178. S. Kotschyi, Hochst. l.c. S. macrostachyum, Hochst. in Schimp. Pl. Abyss. n. 1705. Pollinia striata, Spreng. Pugill. ii. 12. Andropogon Brownii, Kunth Revis. Gram. i. 163. A. lineatus, Robertianus, Schima & tacazensis, Steud. l. c. 369. A. macrostuchyus & inscalptus, Anderss. in Schweinf. Beitr. Fl. Æthiop. 310. A. nervosus, Rottl. in Ges. Naturf. Fr. N. Schrift. iv. (1863) 218; Stgud. l.c. A. striatus, Klein ex Willd. Sp. Pl. iv. 903; Br. Prodr. 201; Spreng. l. c. 298. A. schangulensis, Rupr. in Kotschy Hist. Æthiop. n. 581; Steud. l. c. 369.—Andropogon, Wall. Cat. n. 8818.

RAJPOOTANA and the CENTRAL PROVINCES, Duthie. The DECCAN, Heyne, &c. BURMA, Wallich, &c. CEYLON, Thwaites.—DISTRIB. eastwd. to Australia, and

westwd. to the Cape Verd Islds.

Stems 2-3 ft., tufted on a short stout creeping rootstock, stout or slender, nodes glabrous. Leaves 6-10 in., glaucous, tips fliform, nerves strong; sheath ribbed glabrous or hairy; ligule of silky hairs. Spikes 2-5 in., erect, pale, joints rather otherent; pedicels rather slender, compressed, 2-angled, ciliate, about half as long as the sessile spikelet. Sessile spikelets \(\frac{1}{6} - \frac{1}{4} \) in., callus shortly bearded; gl. I narrow, nearly flat, nerves very strong especially upwards, those between the lateral irregular in position and length, often anastomosing, margins narrowly incurved; II elliptic, 2-toothed, keel narrowly winged below the slender awn; III linear-oblong or lanceolate, acute, ciliate, palea as long glabrous 2-nerved; IV = \(\frac{1}{4} \) III, oblong, 3-nerved, ciliate; awn 1\(\frac{1}{4} - 2 \) in., column stout; palea = the gl., linear-lanceolate, 2-cuspidate, green or purplish, keels narrowly margined, nerves 5-7 very strong scaberulous, lateral pairs close to the margin; II lanceolate, 3-nerved, acuminate; IV awnless.

22. **I. sulcatum,** Hack. Monogr. Androp. 248; stem simple or branched from the base, leaves linear or lanceolate scaberulous, base rounded or subcordate, gl. I of sessile spikelet narrowly linear-lanceolate glabrous, tip acuminate 3-cuspidate dorsally convex with a narrow deep median channel margins incurved, nerves obscure, II linear-lanceolate 2-cuspidate awned, IV 2-fid awned between the lobes.

The CONCAN, DECCAN and CENTRAL PROVINCES, &c.

Stems 8-18 in., usually much branched with many solitary terminal spikes, slender, glabrous, nodes glabrous, peduncles very slender. Leaves 2-10 in., glaucous, scaberulous above, setaceously acuminate, strongly nerved; sheath slender, smooth; ligule a ciliate membrane. Spikes 2-3 in., strict or curved, green; joints and pedicels = 1 the lower spikelet, slender, ciliate, tips obliquely truncate. Sessile spikelets in.; callus short, bearded; gl. I scaberulous, tip setiform, keel narrowly margined or winged towards the tip on one side, or simply scaberulous, nerves 2 on each side the furrow; II chartaceous, keel scabrid and margins ciliate above the middle, awn capillary; III = 1 I, hyaline, acute, paleate, ciliate, palea as long truncate; IV linearoblong, 3-nerved; awn 1-11 in., column stout, brown; palea = the gl. 2-nerved. Pedicelled spikelets smaller than the sessile, neuter, awnless; gl. I lanceolate, 2-cuspidate, 7-nerved, not channelled, margins incurved, keels margined or winged; II not awned: III as in the sessile spikelet: IV acute not awned.—Varies greatly in habit from a single ascending stem with one spike to a copiously branched one with many spikes. Hackel describes gl. IV of the sessile spikelet as narrowed into the awn, not 2-fid as I find it.

23. I. ramosissimum, Hack. Monogr. Androp. 249; stem erect excessively paniculately branched, spikes short in leafy panicles glabrescent, gl. I of sessile spikelet linear-oblong very obtuse emarginate 8:10-nerved deeply channelled between the median nerves margins involute not keeled aculeolately ciliate above, II obtuse mucronulate 5-nerved keel scabrid above with a pencil of hairs, III linear obtuse 3-nerved ciliate paleate, IV = II narrowly linear 1-nerved glabrous narrowed into a stout awn.

E. Indies? Huegel.

Stem 3-4 ft. Leaves linear-lanceolate, glaucous, glabrous, margins scabrid; ligule chartaceous, truncate. Spikes 1-1½ in., straw-colrd., joints linear, compressed, shortly rigidly ciliate, tips excised. Sessile spikelets ½ in. Pedicelled spikelets ½-½ in., linear-lanceolate; gl. I flat acuminate many-nerved; II linear, obtuse, 5-nerved; IV awnless.—The two lowest pair of spikelets are imperfect and awnless. I know nothing of this plant.

24. **I.** spathiflorum, Hook. f; tall, stout, much branched above, spikes enclosed in long narrow spathes very slender, joints and pedice's long, sessile spikelets $\frac{1}{3}$ in narrowly linear-lanceolate, gl. I of sessile spikelet dorsally deeply channelled densely silkily villous to above the middle, keels rounded scabrid above, II truncate and mucronulate, IV linear-oblong, awn slender inserted between 2 subulate teeth. Trachypogon fasciculatus, Munromss.

BOMBAY; hills of Salsette Isld. in stony places, Jacquemont (n. 797).

Stem 3-4 ft., as thick as a goose-quill below, leafy above, branches erect, nodes glabrous. Leaves 12-18 by 2 in., finely acuminate, narrowed from the middle to the base, almost petioled, thin, sparsely hairy above and beneath, margins smooth, midrib stout pale, nerves obscure; sheath of lower 6 in. and upwards, terete, quite glabrous, of upper passing into compressed lanceolate fig. spathes 3-4 in. long, which alternate in very slender axillary branchlets, the lower with leafy tips; ligule short, scarious. Spikes about 2 in. long, more or less exserted from the spathes, vory slender, pale st-aw-colrd.; joints and pedicels more than half as long as the sessile spikelet, compressed, one angle ciliate. GL. I of sessile spikelet white with silky hairs, thinly corraceous, nerveless, dorsal channel slender transparent forming a ridge ventrally, margins equally involute from base to 2-fid or truncate 2-cuspidate tip; callus very short, bearded; II chartaceous, dorsally convex, nerveless but with a nerve-like fold towards the ciliate margin, keel with long cilia above the middle, scabrid towards the emarginate tip; III shorter, hyaline, oblong-lanceolate, obtuse, 3-nerved, margin above with reflexed hairs; palea lanceolate, 2-nerved, anthers imperfect; IV as long as III, linear, 3-nerved; awn 11 in., yellow, rather testaceous, palea 0. Pedicelled spikelets longer, \(\frac{1}{2}\) in.; gl. I dorsally convex (not sulcate), shortly silky, narrowed into a long bisetose glabrous awn.—A very curious species, of which the materials are in rather a young state; it should form a section by itself of Sehima were that genus to be restored.

25. **I. notatum**, Hack. Monogr. Androp. 246; stems tall tufted, leaves linear narrowed from the base upwards, rigid substrigose, spikes rather stout fragile, gl. I of sessile spikelets oblong, gl. I ovate-oblong glabrous, tip membranous 2-cuspidate dorsally flat with 2 carinal nerves and 2-3 intermediate short green anastomosing ones, keels margined or winged, II 3-nerved shortly awned, IV shorter oblong 2-fid ciliate awned in the cleft.

WESTERN HIMALAYA, alt. 4-7000 ft., from Chamba, Thomson, to Kumaon,

Strackey & Winterbottom.

Stem erect, naked or pubescent below the spike, nodes glabrous. Leaves 6-10 by \(\frac{1}{6} \) in., setacrously acuminate, green or hoary; sheath bearded at the tip; ligule of long hairs. Spikes 3-8 in., strict or curved, fragile, puberulous; joints and pedicels subclavate, half as long as the sessile spikelet, villously ciliate, tips obliquely truncate. Sessile spikelets \(\frac{1}{2} \) in., callus short bearded; gl. I obliquely ovate-oblong, tip membranous, margins very narrowly inflexed, keels one or both narrowly winged; II chartaceous, entire, 3-nerved, keeled and narrowly winged in the upper third; 111 oblong, obtuse, ciliate, 2-nerved, palea 2-nerved eciliate; IV 3-nerved, awn \(\frac{1}{2} -1 \) in.; palea linear-lanceolate. Pedicelled spikelet, gl. I lanceolate, acuminate, 2-cuspidate, 7-9-nerved; II lanceolate, acute, glabrous; III as in the sessile; IV awnless.

Sect. III. Spikes few or many, subracemose. Gl. I of sessile spikelet deeply or obscurely channelled along the mesian line.

26. **I. petiolare**, Hack. Monogr. Androp. 238; tall, stout, leaves long narrowed at the base or petioled, spikes many subpaniculately fascicled, gl. I linear-oblong keels narrowly winged towards the 2-toothed truncate tip dorsally deeply channelled, II cymbiform acuminate or mucronate, IV

cleft to below the middle, awn very short inserted in the cleft. P. Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 198. Spodiopogon petiolaris, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 301. S. Lehmanni, Grisch. in Goetting. Nachr. (1868) 91. Pollinia Lehmanni, Wight & Arn. ex Nees Pl. Meyer, 186; Duthie Grass. N.W. Ind. 16. Andropogon petiolaris, Stend. Syn. Gram. 398. P.A. petiolatus, Dalz. & Gibs. Bomb. Fl. 303.—Wall. Cat. 8807 A.

SUBTROPICAL HIMALAYA, alt. 5-8000 ft., from Garwhal to Nepal. KHASIA HILLS, alt. 4-5000 ft. ? The Concan, Dalzell, Lisboa. Burma; Karen Hills, Kurz.

Stem 2-3 ft., simple or branched, pubescent below the spikes; nodes pubescent. Leaves 8-12 by \frac{3}{4}-1\frac{1}{4} in, setaceously acuminate, more or less hairy, margins scabrid; sheath glabrous or margins ciliate; ligule stiff, oblong, truncate. Spikes 8-20, \frac{1}{2}-1\frac{1}{4} in., simple or divided, rachis glabrous, axils bearded; joints and pedicels flattened, subtrigonous, about as long as the spikelets, shortly ciliate. Spikelets \frac{1}{4}-\frac{1}{4}\$ in., oblong-lanceolate, pale greenish; callus minute, shortly bearded; gl. I chartaceous, 6-8-nerved to the tip, margins rather broadly inflexed from base to tip; keels scabridly ciliate; II chartaceous, keel scabrid, 3-nerved; III = I, oblong, obtuse, hyaline, ciliate, 3-nerved, paleate, male, palea oblong-lanceolate 2-nerved ciliate; IV = \frac{1}{2}\$ III, glabrous, 3-nerved, lobes acute, awn \frac{1}{2}-\frac{1}{2}\$ in.; palea = the gl., lanceolate, 2-nerved, glabrous. Pedicelled spikelet like the sessile, but gl. I hardly chaunelled; III epaleate; IV male.—As Hackel remarks, this has the habit of a Pollinia sect. Leptatherum (where I should have been disposed to place it) with the spikelets more of an Ischæmum. I have seen no Concan specimen.

27. **I. robustum**, Hook. f.; tall, stout, leaves long narrow coriaceous softly tomentose on both surfaces, spikes few racemed strict erect, joints very stout obliquely truncate lower minutely puberulous, sessile spikelets 1—1 in ovate- or oblong-lanceolate acute coriaceous awnless dorsally flat quite glabrous with 6-9 broad low nerves, keels scabrid above the middle, II coriaceous 7-9-nerved, III 3-nerved paleate male, IV oblong apiculate awnless.

N.W. HIMALAYA; "Pauni, in Bursahir, alt. 7000 ft.," Brandis (Herb. Calcutt.). Stem several feet high from a hard rootstock, hard, solid, nearly as thick as a goose-quill, naked below. Leaves 12-18 by \(\frac{1}{6-\frac{1}{6}}\) in., narrowed from the base to the long acuminate tip, sides incurved scaberulous, midrib very stout; sheath long, fluely pubescent; ligule a brush of long hairs. Spikes 4-5 in., lower stipitate; pedunole stout, glabrous; joints \(\frac{1}{6}\) shorter than the spikelets, dorsally rounded, ventrally deeply concave. Sessile spikelets quite glabrous, appressed to the rachis, upper in the spike smaller than the lower; callus very short, stout; gl. I sometimes channelled in the middle, very variable in the number and position of the rib-like nerves, tip minutely toothed, margins narrowly incurved; II as long as I, eciliate; III shorter, male; palea, ovate-lanceolate, 2-nerved, eciliate; IV as long as III, rigidly membranous, 3-nerved; palea nearly as long, 2-nerved, both eciliate. Pedicelled spikelet \(\frac{1}{2}\) smaller than the sessile; gl. I oblong-lanceolate, acuminate, other gls. and palea as in the sessile, but both fig.—Very unlike any other N. Indian species.

DOUBTFUL SPECIES.

I. COROLLATUM, Nees ex Steud. Syn. Gram. 369; Duthie Grass. N.W. Ind. 18; Hack. Monogr. Androp. 252. Andropogon corollatus, Steud. l.c.—Mussoorie, Royle.

I. Hugelii, Hack. Monogr. Androp. 252; annual, glabrous, decumbent and branched below, leaves 1-12 by \(\frac{1}{4}\) in. flat flaccid, upper sessile cordate-lanceolate, lower shortly, petioled, spike solitary 1\(\frac{1}{2}\)-2 in. rather stout, joints clavate dorsally convex, gl. I of sessile spikelets oblong obtuse coriaceous below with often interrupted ridges about the middle glabrous or dorsally ciliate, margins narrowly inflexed scabrid, II ovate deeply keeled, III oblong hyaline glabrous paleate, IV linear-

lanceolate acute 1-nerved awnless glabrous, palea as long as the gl. Pedicelled spikelet awnless, pedicel very short; gl. I linear-lanceolate, flat, acuminate many-nerved.—The Panjub, at Busahir, Huegel.—Hackel describes this as very like I. semisagittatum, and makes of it a subgenus of Ischæmum, characterized by the solitary spike, stout joints, and awnless spikelets, closely connecting Ischæmum with Rottboellieæ.

I. LONGISPICATUM, Munro ex Duthie Grass. N.W. Ind. 18, name only.

38. EREMOCHLOA, Buse.

Perennial grasses. Leaves more or less equitant, rigid. Spikelets 1-fld., flat, secund, solitary, sessile at each internode of a terminal narrow compressed spike, with a rudimentary pedicelled. Glumes 4, I nearly flat, oblong, smooth, coriaceous, not awned; margins pectinate; II ovate-lanceólate, acuminate, chartaceous, 3-nerved; III hyaline, oblong, obtuse, paleate, male; IV smaller, hyaline, oblong, obtuse, 1-nerved, fem. or bisexual; palea oblong-lanceolate. Lodicules obliquely truncate. Stamens 3, anthers long. Stigmas short, feathery.—Species 8, E. Asia and Australia.

1. E. muricata, Hack. Monogr. Androp. 262; gl. I broadly ovate-oblong with 2 fan-shaped terminal wings. Ægilops ciliaris, Koen. in Neue Schrift. Ges. Nat. Berl. iv. (1810) 210; Roem. & Sch. Syst. ii. 772; Grift. Notul. iii. 110, Ic. Pl. Asiat. t. 158 (excl. 4 upper left-hand figs.). Æ. muricata, Retz. Obs. ii. 27. Ischæmum pectinatum, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 296; Wall. Cat. n. 8847; Thwaites Enum. Pl. Zeyl. 436; Trim. Cat. Ceyl. Pl. 107. I. ciliare, Nees in Herb. Wight. n. 1717 (not of Wight Cat.). Andropogon pectinatus, Steud. Syn. Gram. 369. Rottboellia muricata, Retz. l. c. iii. 12.

SOUTH DECCAN PENINSULA, Koenig, &c. CEYLON; Trincomalee, Glenie.—DISTRIB. Australia.

Quite glabrous. Stem 6-18 in., compressed. Leaves 3-6 by \(\frac{1}{2}\)-1 in., tips rounded apiculate. Spike 2-5 in., linear; rachis glabrous, brittle, not excavated. Spikelets \(\frac{1}{2}\) in.; gl. I nearly orbicular, dorsally slightly convex, many-nerved, wings crenate; spines very many, upcurved, nearly as long as the gl. is broad. Pedicelled spikelet a single lanceolate acuminate coriaccous nerved gl. with thin inflexed margins.

2. E. bimaculata, Hack. Monogr. Androp. 265; gl. I elliptic sub-acute with 2 small low rounded terminal wings, spines shorter than the gl is broad. Ischæmum pectinatum, Benth. Fl. Austral. vii. 521.

UPPER BURNA; near the Serpentine Mines, Griffith.—DISTRIB. Australia. Habit, &c. of E. muricata, but leaves much narrower, narrowed at the obtuse tip; spikes more slender; spikelets much narrower, with fewer nerves and shorter spines, callus puberulous.

3. **E. zeylanica**, Hack. Monogr. Androp. 263; gl. I elliptic obscurely winged at the subacute tip, spines longer than the gl. is broad. Trim. Cat. Ceyl. Pl. 107. Ischæmum pectinatum, Wight Cat. n. 1717. I. falcatum, Thw. Enum. Pl. Zeyl. 436.

CEYLON, Walker, Thwaites (C.P. 3327). ? DECCAN PENINSULA, Wight. Habit, size of spikelets, &c. as in bimaculata, of which it is probably only a variety, differing chiefly in the long spines of gl. I and glabrous callus.

4. E. leersioides, Hack. Monogr. Androp. 264; gl. I narrowly oblong acute, spines subsrect longer than the gl. is broad. Isohamum leersioides, Munro in Proc. Amer. Acad. iv. (1864-5) 363; Benth. Fl. Hongk. 425.

PEGU. Kurz.-DISTRIB. China, Tonkin.

Very near E. zeylanica, but gl. I is smaller and narrower with the long spines of E. muricata.

5. **21. Helferi**, Munro ex Hack. Monogr. Androp. 266; gl. I broadly ovate subacute, spines longer than the gl. is broad, upper spikelet a scabrid pedicelled bristle. E. ciliatifolia, Hack. l. c.

TENASSERIM, Griffith, Helfer.

Leaves 4-6 by \(\frac{1}{2}\) in. (broader than in the other species), flat, ciliate, tip rounded. Spike 1-1\(\frac{1}{2}\) in. Spikelets \(\frac{1}{2}\) in.; gl. I 5-uerved, nerves anastomosing above.

39. POGONATHERUM, Beauv.

Delicate annual or perennial grasses with capillary peduncles. Leaves erect. Spikelets 1-2-fld., binate (usually a sessile bisexual and pedicelled fem.) imbricate on the fragile rachis of a solitary terminal capillary spike, 2-awned; awns capillary, often interlaced. Glumes 4, membranous; I oblong, concave, tip truncate or rounded, long ciliate; II as long as I or rather longer, tip acute or 2-toothed, awn terminal; III (in the upper spikelet 0) hyaline, paleate, male; IV hyaline, narrow, 2-fld, long-awned, palea oblong glabrous. Lodicules 0. Stamens 1 or 2, anthers long. Stigmas slender. Grain oblong, free.

The following three species are probably forms of one, being united by many intermediates; they are however for the most part readily distinguishable in India.

1. P. saccharoideum, Beauv. Agrost. 56, t. 11, f. 7; spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in., gl. I truncate retuse or tip rounded, II ciliate above the middle, stameus 2 rarely 1. Thw. Enum. Pl. Zeyl. 365; Trim. Cat. Ceyl. Pl. 107; Duthie Grass. N. W. Ind. 16, Fodd. Grass. N. Ind. 27. P. saccharoideum, a. genuinum, Hack. Monogr. Androp. 193. P. polystachyum, Roem. & Sch. Syst. ii. 497; Wight Cat. n. 1679; Wall. Cat. n. 8844. Pollinia polystachya, Spreng. Syst. i. 288; Kunth Revis. Gram. 493, t. 162. Perotis polystachya, Willd. Sp. Pl. i. 324. Saccharum paniceum, Lamk. Encycl. i. 595, Illust. t. 40, f. 31.

• Throughout the hilly parts of India, in dry places, from the PANJAB eastward to BHOTAN, MANIPUR and BURMA, ascending the Himalaya to 4000 ft., and southward to Central India and Ceylon.—Distrib. China, Malaya.

Stem 6-18 in. usually densely tufted, nodes glabrous or bearded. Leaves 1-3 in. Spikes 1-1 in. Hairs of callus shorter than the spikelet.

2. P. crinitum, Trin. Fund. Agrost. 166; spikelets 1/4-1/3 in., gl. I truncate, II glabrous or nearly so, stamens 1 rarely 2. Kunth Enum. Pl. i. 478, Suppl. 380, Aitchis. Cat. Panjab. Pl. 173, Franch. & Sav. Enum. Pl. Jap. ii. 189 (excl. cit. Beauv.). P. saccharoideum, var. β. monandrum, Hack. Monogr. Androp. 193. P. polystachyum, Kunth Revis. Gram. 493 (in part) t. 161. P. refractum, Nees in Hook. & Arn. Bot. Beech. Voy. 239; in Pl. Meyen. 182. Pollinia monandra, Spreng. Syst. i. 288. Pogonopsis tenera, Presl Rel. Henk. i. 133, t. 46. Homophits crinita, Trin. Fund. Agrost. 166. Ischemum crinitum, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833) 298. Andropogon crinitus, Thunb. Fl. Jap. 40, t. 7. A. monandrus, Rosb. Fl. Ind. i. 260; Steud. l. c. 368.—Pogonatherum, Griff. Notul. iii. 81, Ic. Pl. Asiat. t. 145, f. 2.

Throughout INDIA, extending to the Malay Peninsula, usually at lower elevations and in hotter places than P. saccharoideum.—DISTRIB. Affghan, China, Malaya, N. Hebrides.

A different looking plant from the common form of P. saccharoideum, with paler more flexuous squarrose awns, much smaller spikelets, and the hairs of the callus longer than the callus, but intermediates occur, and I could have followed Hackel in uniting them had he included the following.

3. P. rufo-barbatum, Griff. Notul. iii. 81, Ic. Pl. Asiat. t. 145, f. 11; spikelets 1-4 in., gl. I broadly 2-lobed. III villous above the middle, IV and its palea ciliate, stamens 2. Hack. Monogr. Androp. 193. P. majus, Griseb. in Goett. Nachr. (1868) 92.

KHASIA HILLS; by streams, alt. 3-5000 ft., Griffith, &c. Stem 10-24 in.; nodes glabrous. Leaves 2-4 in., sometimes 1 in. broad. Spikes 1-24 in.; hairs of callus shorter than the spikelet; gl. I, 2-lobed but hardly 2-auricled (as described by Hackel).—Only, I think, a large form of saccharoideum growing in wet places.

40. APOCOPIS, Nees.

Annual or perennial grasses. Leaves short. Spikelets 2-fld. (lower fl. bisexual, upper fem.) solitary or the upper reduced to a pedicel, distichously imbricate on solitary or digitate articulate spikes, dorsally compressed. Glumes 4, I broad, cuneiform, coriaceous, many-nerved, tip rounded ciliate; II thinner, truncate, 2-keeled; III narrow, hyaline, paleate: IV hyaline, entire or 2-fid, awned or reduced to an awn dilated at the base; palea very short, convolute, truncate, tip ciliate, or 0. Lodicules 0. Stamens 2-3. Styles very short, stigmas long. Grain terete, free.—Species 3-4, Eastern Asiatic.

1. A. Royleanus, Nees in Proc. Linn. Soc. i. (1894), et in Ann. & Mag. Nat. Hist. vii. (1841) 220; perennial, gl. IV oblong 2-fid, awn short or 0. Hack. Monogr. Androp. 257; Duthie Grass. N.W Ind. 16. Ischesmum paleaceum, Trin. in Mem. Acad. Petersb. Ser. 6, ii. (1833) 293; Sp. Gram. Ic. t. 333. Andropogon paleaceus & himalayensis, Steud. Syn. Gram. i. 376, 377. Ischemum denticulatum, Herb. Ham. ex Wall. Cat. n. 8857.—Wall, Cat. n. 8843.

SUBTROPICAL HIMALAYA; alt. 3-4000 ft., from Kumaon to Bhotan. KHASIA

HILLS, alt. 4000 ft. MUNNEPORE, alt. 4-5000 ft., Watt. - DISTRIB. Borneo.

Stem erect, 10-24 in., usually simple. Leaves 2-4 in., narrowly lanceolate, acuminate, and sheaths glabrous or softly hairy. Peduncle long, slender; spikes 1-2, rarely 3, erect, 1-14 in.; rachis rusty-villous, brittle. Spikelets about 4 in., much longer than the joints; gl. I truncate, dark red-brown with a broad yellow tip; IV awn very slender, included or if exserted not twice the length of the spikelet.

2. A. Wightii, Nees ex Steud. Syn. Gram. 377; annual, gl. IV linear entire or 2-dentate, awn long. Wight Cat. n. 2352; Hack. Monogr. Androp. 258; Thwaites Enum. Pl. Zeyl. 365; A. Wrightii, Munro in Proc. Am. Acad. iv. 363, et in Benth. Fl. Hongk. 421. A. Beckettii, Thw. ex Trim. Cat. Zeyl. Pl. 107. Amblyachyrum mangalorense, Hochst. ex Hohenack, Pl. Ind. Or. n. 231 & in Flora, xxxix. (1856) 26.

BEHAE, CENTEAL INDIA, throughout the DECCAN PENINSULA, BURMA, and CEYLON.

Stem tall, erect like A. Royleanus, or low and densely tufted. Leaves 1-3 in., glabrous or hairy. Spikes 1-11 in., slender or stout. Spikelets 1-1 in.: gl. I yellow with red-brown tips, or dark brown with yellowish tips, glabrous or clothed with red-brown shiny hairs, tips retuse ciliate with minute or long hairs; II 3-nerved or nerveless, sides sharply inflected, angles smooth or scabrid; III nearly = I, tip ciliolate: IV very narrowly oblong or almost linear, awn two to six times as long as the spikelet; palea very short and convolute. - Very variable, and doubtfully separable from Royleanus which is stouter with stouter spikes. Wight's original specimen (Cat. n. 2352) is 18-20 in. high, very slender, leafy upwards, with slender pale spikes, and glabrous gl. I; it strongly resembles some specimens of Royleanus, and is I suspect perennial. This and a var. zeylanicus (Wightis, Thw.) with more hairy, darker gl. I, forms Hackel's Subsp. genuinus. His Subsp. mangalurensis includes short densely tufted states, with shorter red-brown densely hairy and long-ciliate gl. I; it is the common Deccan form, and includes Thwaites' A. Beckettii. The difference between the narrow gl. IV of all states of A. Wightii, and the much broader hyaline one of A. Royleanus, is one of degree only.

Var. vaginata; spikes more or less included in the long spathiform sheaths of the uppermost leaves. A. vaginatus, Hack. in Estr. Bot. Zeitschr. xli. (1891) 8.—

Huzaribugh, Clarke.

3. A. pallida, Hook. f.; annual, gl. IV reduced to a slender awn.

NILGHIRI HILLS, Foulkes.

Stems slender, stiff, widely creeping and rooting, with short geniculately ascending fig. branches, 2-6 in. high. Leves 1-2 in., linear, acuminate, smooth, sparsely hairy, margins thickened, subscaberulous; sheath open; ligule 0. Spikes \(\frac{1}{2}\)-1 in. \(\frac{1}{2}\) in. diam., very pale; rachis slender, ciliate. Spikelets \(\frac{1}{10}\) in.; gl. I broadly cunciform, ciliate with long hairs, 7-9-nerved; II oblong, obtuse, 3-nerved, lateral nerves submarginal, keels ciliate; III oblong or lanceolate, glabrous, nerveless; IV awn \(\frac{1}{2}\)-1 in., brown, not dilated at the base; palea 0. Pedicelled spikelets, gl. I spathulate, truncate, villous, sides recurved; II as in the sessile spikelets.

41. ARTHRAXON, Beauv.

Annual or perennial slender grasses. Leaves short, broad, deeply cordate. Spikelets 1-fld., solitary or with a rudimentary pedicelled second, sessile on binate digitate or fascicled jointed spikes. Glumes 4, I largest, usually strongly tubercled, not embracing the inner; II keeled, 3-nerved; III small, hyaline; IV shortest, lanceolate, keeled, hyaline, with usually a long dorsal or basal awn; palea minute or 0. Lodicules subquadrate. Slamens 2-3. Styles short or 0, stigmas long, laterally exserted. Grain narrowly linear.—Species 8, tropics of Old World.

Sect. I. Pleuroplitis. Joints of rachis of spike rectangularly truncate.

- * Stamens 3, anthers large, nearly as long as gl. IV.
- 1. A. lanceolatus, Hochst. in Flora, xxxix. (1856) 188; spikelets linear-lanceolate, gl. I linear dorsally convex smooth margins hyaline inflexed, marginal nerves armed with very strong curved teeth. Hack. Monogr. Androp. 347; Duthie Grass. N.W. Ind. 17. A. echinatus & serrulatus, Hochst. l.c. Batratherum echinatum, Nees in Edinb. Phil. Journ. xviii. (1835) 181; Wall. Cat. n. 8829; Aitchis. Cat. Panjab Pl. 174. B. lanceolatum, Nees l. c.; Wight Cat. n. 1684. B. serrulatum, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 458. Andropogon echinatus, Herb. Heyne ex Wall. Cat. n. 8829; Steud. Nom. Ed. II. i. 191; Edgew. in Journ. As. Soc.

Beng. xxi. (1853) 182; Duthie Grass. N.W. Ind. 16. A. lanceolatus, Roxb. Fl. Ind. i. 257; Kunth Enum. Pl. i. 498. A. prionodes, Maxim. in Bull. Soc. Nat. Mosc. liv. (1879) 68 (non Steud.). A. serrulatus, Link Enum: Hort. Berol. i. 241; A. Rich l.c. Thelepogon elegans, Roth Nov. Sp. 62 (char. fals.), ex Roem. & Sch. Syst. ii. 788; Wight Cat. n. 1684.—Batratherum, Wall. Cat. n. 8830.

WESTERN HIMALAYA, alt. 5-8000 ft. from Kashmir to Nopel. Plains of the PANJAB and RAJPOOTANA. BEHAR, on Parusnath, alt. 4000 ft., Clarke. Coro-

MANDEL, Roxburgh. SIND, Stocks .- DISTRIB. Abyssinia, Tonkin, China.

A tall much-branched suberect or subscandent grass 1-3 ft. high with rigid stems thicker than a crow-quill. Leaves very variable, from broadly ovate and \(\frac{1}{2}\)-3 in. by \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., to narrowly lanceolate and 1-4 by \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., caudate-acuminate, flaccid or rigid, glabrous or hairy, margins serrulate or ciliate with stiff hairs, nerves obscure; ligule rounded. Spikes few or many, \(\frac{1}{2}\)-2 in., rachis sparsely hairs, joints about half as long as the spikelet, margins ciliate. Spikelets \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., very narrow; gl. I acute, tip hyaline 5-7-nerved, dorsally smooth or muriculate; II lanceolate, 3-nerved; III shorter, linear-oblong, acute; IV hyaline, awn about 1 in. long. Pedicelled spikelets linear-lanceolate, keels hispidulous; anthers perfect.—Hackel has 5 varieties and subvarieties of this species, but I fail to limit them after studying copious materials.

2. A. rudis, Hochst. in Flora, xxxix. (1856) 188; spikes few, spikelets ovoid, gl. I ovate acute convex 7-nerved, nerves above armed with a few irregular spinescent tubercles, margins hyaline narrowly incurved 1V paleate. Hack. Monogr. Androp. 348. Andropogon rudis, Steud. Syn. Gram. 383; Thwaites Enum. Pl. Zeyl. 368; Trim. Cat. Ceyl. Pl. 107. A. castratus, Griff. Notul. iii. 89. Batratherum rude, Nees ex Steud. l. c.—Arthraxon, Wall. Cat. n. 8834, 8837.

UPPER ASSAM; Suddiya, Griffith. SILHET, de Silva. CEYLON; in the Central

Province, Thwaites (C.P. 866).

Stem 1-2 ft., erect from a geniculate branched rooting (blood-red, Griff.) base, rigid, as thick as a crow-quill or less. Leaves 2-4 in., lanceolate, acuminate, glabrous or sparsely hairy, margins strongly ciliate. Peduncle long, slender, naked. Spikes 1, 2, or few, \(\frac{1}{2}\)-1 in., peduncled; peduncle and rachis rather stout smooth, with sometimes an empty glume. Spikelets \(\frac{1}{2}\) in. (red-brown, Griff.), coriaceous; gl. I 9-nerved; II 3-nerved, acute; III hyaline, oblong, ciliate, 1-nerved; IV lanceolate, ciliate, awn inserted below the middle, about twice as long as gl. I1, palea linear-oblong, ciliate.—The only species in which I have seen a palea to gl. IV.

3. A. breviaristatus, Hack. Monogr. Androp. 350; spikes many, spikelets ovate-lanceolate, gl. I oblong-lanceolate subacute convex nerves 7 pair tubercled nearly to the base, II acute keel ciliate margins with deflexed cilia, awn short. Batratherum khasianum, Munro mss. B. echinatum, Herb. Ind. Or. Hf. & T. (in part).

KHASIA HILLS, alt. 5000 ft., Griffith, &c.

Stems 2-4 ft., geniculately branched below, about as thick as a dove's quill. Leaves 1-2\frac{1}{2}\text{ in., ovate or ovate-lanceolate, finely acuminate and sheaths glabrous or hairy. Peduncle long, usually naked, slender. Spikes 10-20; 1-3 in.; rachis and pedicels nearly glabrous. Spikelets \frac{1}{4}-\frac{1}{2}\text{ in., purplish; gl. I variable in the number and size of tubercles on the nerves; IV not much shorter than II, awn subbasal, shortly exserted. Anthers very large (sometimes 2 only?)—Resembles a very large A. ciliaris.

4. A. submuticus, Hochst. in Flora, xxxix. (1856) 188; spikes few short pale, spikelets all sessile very small linear-oblong terete, gl. I

7-nerved, nerves more or less muriculate, II acute keel ciliate, IV with a very short included basal awn or 0. A. ciliaris, Subsp. 6, submuticus, Hack. Monogr. Androp. 356. Batratherum submuticum, Nees ex Steud. Syn. Gram. 382; Duthie Grass. N.W. Ind. 17. Andropogou submuticus. Steud. l.c.—Arthraxon, Wall. Cat. n. 8835 B (in part) & 8836.

WESTERN HIMALAYA; from Garwhal to Central Nepal, alt. 2-6000 ft., Wallich,

&c. TAVOY, Gomez. - DISTRIB. China, Loochoo Islds.

Annual. Stems 6 in.—3 ft., slender, much-branched and rooting below, as thick as a sparrow's quill. Leaves \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., broadly ovate-cordate, acuminate, and sheaths glabrous or hairy, margins strongly ciliate. Peduncle filiform, usually long and naked. Spikes 3-5, \(\frac{1}{2}\)-1 in. long, very slender; rachis quite glabrous, flexuous. Spikelets \(\frac{1}{2}\) in.; pale, all sessile (male?). Stamens as long as gl. IV.—A puzzling plant, and possibly the male of an unrecognized form of ciliaris from which species it differs in the 3 stamens as long as gl. IV, as well as in the minute flowers, and usually the want of an awn, though a very short one is sometimes present. One very long specimen (Herb. J. S. Lace) has besides the terminal naked peduncle, very short sheathed lateral ones.

5. A. spathaceus, Hook. f.; slender, panicles (always?) in long spathiform narrow sheaths, spikes few, spikelets oblong-lanceolate, gl. I of sessile spikelet oblong-lanceolate 5-7-nerved, nerves covered throughout their length with a row of acute tubercles, awn of gl. IV dorsal.—Batratherum, Herb. Wight n. 3257.

DECCAN PENINSULA; Gunde Cottah Hill fort, Cuddapah, Wight Herb. 357.

Stems 1-2 ft., not thicker than a sparrow's quill, branched. Leaves 1-2 in., oblong-lanceolate, acuminate, flaccid, ciliate and sheaths sparsely hairy; floral sheaths terminal, erect, 1½-2 in. by ½-½ broad, membranous, green, usually overtopping the panicle. Spikes ½-½ in., very pale; pedicels and joints sparsely hairy. Upper spikelets male; gl. I quite smooth, striate; II hyaline; IV awnless. Stamens more than half as long as gl. IV, linear.—A well-marked species by the spathe and tubercles of gl. I. A specimen from Belgaum (Ritchia, n. 796 in Herb. Muuro) closely resembles this in the tubercled gl. I; it has only 2 very small imperfect anthers and no pedicelled spikelets.

6. A. inermis, Hook. f.; spikelets solitary (pedicelled 0) oblong-lanceolate, gl. I dorsally convex obtuse strongly 7-9-nerved unarmed margins (not incurved) and nerves scabrid.

The CONCAN, Woodrow.

Stems very slender, much geniculately branched. Leares 1-2 in., ovate, broadly amplexicanl, caudate-acuminate, tips setaceous, glabrous or puberulous above, ciliate with long hairs beneath, margins smooth; sheath hairy. Spikes few, short, green, irregularly sparingly divided; peduncle slender, naked, branches \(\frac{1}{2}\) in., very slender, ciliolate. Spikelets \(\frac{1}{10}\) in., all sessile, rather distant; gls. thin, I strongly nerved; II as long as I, obovate-oblong when spread out, obtuse, emarginate, apiculate, 3-nerved, hardly keeled, nearly smooth; III 0 (or palea of IV) shorter than II, lanceolate; awn basal, twice as long as the spikelet; palea oblong, obtuse, glabrous. Anthers very large.

- ** Stamens 2 or 3; anthers not half the length of gl. IV.
- 7. A. ciliaris, Beauv. Agrost. 3, t. xi. f. b; peduncles glabrous below the spikes, spikes many \(\frac{1}{3} 3 \) in. subflexuous, joints = \(\frac{2}{3} \) the spikelets in length or longer glabrous or shortly ciliate, gl. I entire at the tip, nerves scabrid or echinate above the middle, II acute or acuminate. Hack. Monogr. Androp. 354; Benth. Fl. Austral. vii. 524 (excl. syn.).

Hance in Journ. Linn. Soc. xiii. (173) 134. Andropogon Retzii & incertus, Steud. Syn. Gram. 375.—Arthraxon, Wall. Cat. n. 8833. 8835 A. (B. in part) 8836.

Hilly districts of INDIA from Kashmir eastwards to Burma, ascending the Himslaya to 5500 ft., and southward to the Nilghiri Hills and CEYLON.

Stems tall or short, weak, rarely as thick as a crow-quill, tufted and branched from the base, or with long creeping stems and ascending leafy branches. Leaves 1-3 in., ovate to lanceolate, glabrous or laxly hairy, margins ciliate; sheath with ciliate margins. Spikes few or many, on long naked or spathaceously sheathed glabrous peduncles, pale green or purplish. Spikelets 1-1 in., lanceolate or linearlanceolate, callus naked or shortly bearded; gl. I scaberulous, 7-10-nerved; II obscurely 3-nerved; III much shorter, oblong soute; IV usually awned. Stamens variable in length never = 1 gl. IV.—I give below Hackel's grouping of the two principal forms of this protean plant and their synonymy. For his elaborate subdivision of these into 4 subspecies and 9 varieties I must refer to his work. These are founded on characters of unequal value, and subject to diverse limitations. After a long study of the mass of materials at Kew I recognize the following widely distributed leading Indian forms: -1, A. violaceus; rather robust, spikes 6-20 1-2 in. long, spikelets } in. more or less purple, awns twice as long as the spikelet or shorter; 2, nudus, usually tall and widely straggling, spikes many 1-2 in. very slender rachis capillary, sparsely hairy, spikelets $\frac{1}{10} - \frac{1}{8}$ in. narrow very pale, stamens as often 3 as 2; 3, plumbeus, stems shortly straggling much branched, leaves small, spikes 2-3 rarely more $\frac{1}{4} - \frac{3}{4}$ in. long, rachis capillary nearly glabrous, spikelets $\frac{1}{10}$ in. usually purple, approaches nearest to A. microphyllus; 4, muriculatus; habit of plumbeus, but nerves of gl. I echinulate nearly to the base.—N. W. India.

Hackel's two leading groups to which I have added a third :--

a. Joints of rachis glabrous, or with a few scattered hairs towards the tip.

A. ciliaris, Beauv. l. c. A. gracilis & lasiocoleos, Hochst. in Flora, xxxix. (1856) 188, 189. A. japonicus, Miq. Ann. Mus. Bot. Lugd. Bat. ii. 288. A. lanceolatus & nudus, Hochst. in Flora, xxxix. (1856) 159. A. Langsdorflanus, Hochst. l. c.; Boiss. Fl. Orient, v. 455. A. nudus, Benth. ex Clarke in Journ. Linn. Soc. xxv. (1889) 86. Batratherum nudum, Nees ex Steud. Syn. Gram. 383. Pleuroplitis ceutro-asiatica, Griseb. in Ledeb. Fl. Ross. iv. 477. P. Langsdorfflans, Trin. Fund. Agrost. 175, t. 16. Lucwa gracilis, Kunth Revis. Gram. ii. 489, t. 159, Enum. i. 472. L. Laug-dorfflana, Steud. l. c. 413. Lasiolytrum hirtum, Steud. in Flora (1846) 18; Syn. Gram. 12. Las. pilosum, Steud. ex Jord. in Num. Soc. Sc. Nat. Cherb. v. (1857) 299. Pollinia ciliaris, Spreng. Syst. i. 289. Andropogon amplexifolius, Trin. in Mem. Acad. Petersb. Ser. VI. ii. 1833, 274. A. lasiocoleos & nudus, Steud. l. c. 383. Phalaris hispida, Thunb. Fl. Jap. 44. Deyeuxia japonica, Spreng. l. c. 254.

b. Joints of rachis, at least the upper, more or less ciliate.

A. coloratus, major, Schimperi, Schmidtii & violaceus Hochst. l. c. 188, Batratherum plumbeum, Munro ex Duthie in Atkinson Gazette, 640. Pleuroplitis ciliata, Schmidt Beitr. Fl. Cap. Verd. Ins. 152. P. plumbea & violacea, Steud. l. c. 414. P. Quartiniana, Begel in Bull. Acad. Petersb. v. (1866) 757, Wight Cat. u. 1683. P. caucasica, Rupr. ex Regel in Bull. Acad. Petersb. v. (1866) 373. Lucea ciliata, major, plumbea & violacea, Steud. l. c. 414. Andropogon Alectoridia, Steud. l. c. 383. A. violaceus, Heyne ex Steud. l. c. 414. Alectoridia Quartiniana, A. Rich. Tent. Fl. Abyss. ii. 448, t. 99.—Wall. Cat. n. 8833 A.

c. Spikes silkily villous, spikelets 1-1 in., gl. I acu'e entire or minutely 2-toothed,

awn in. or more.

A. cuspidatus, Hochst. in Flora (1856) 188; Hack. Monogr. Androp. 353. A. micans, Hochst. l. c. Batratherum micans, Nees in Ann. & Mag. Nat. Hist. vii. (1835) 220. Pleuroplitis major, Reyel in Bull. Acad. Petersb. v. (1866) 750 (excl. Syn. Lucaa major). Andropogon cuspidatus, Hochst. ex A. Rich. Tents Fl. Abyss. ii. 456. A. lanceolatus, Baker Fl. Maurit. 444 (non Rosb.). A. micans, Stoud. Syn. Gram. 382.—N.W. Himalays, Nilghiri Hills, Mauritius, Afr. trop.

8. A. microphyllus. Hochst, in Flora, xxxix. (1856) 188; peduncles puberulous beneath the spikes, rachis of spikes strict, joints = 1 the spikelets in length or shorter ciliate with long hairs, spikelets 10-1 in., nerves of gl. I scaberulous above the middle tip 2-toothed or 2-aristulate, II acuminate or awned, IV obtusely 2-toothed, awn very slender. Hack. Monogr. Androp. 353. A. lancifolius, microphyllus, & minor, Hockst. in Flora xxxix. (1856) 188. Batratherum molle, Nees & Arn. in Mag. Nat. Hist. l. c. 181; Wight Cat. n. 1686; Aitchis. Cat. Panjab Pl. 174. B. Schimperi, Nees ex Hochst. l. c. 177. Pleuroplitis lancifolia, microphylla & Schimperi, Regel in Bull. Acad. Petersb. x. (1866) 747-756. Lucasa Schimperi, Steud. Syn. Gram. 414. Andropogon microphyllus, Trin. in Mem. Acud. Petersb. Ser. VI. ii. (1833) 275. A. lancifolius, Trin. l.c. 271; Thw. Enum. Pl. Zeyl. 368; Trim. Cat. Ceyl. Pl. 108. A. minor, Hochst. l. c. 188. A. molle, Duthie Grass, N. W. Ind. 17. A. muralis, Herb. Ham. ex Wall. Cat. n. 8828. A. multicaulis, Steud. l. c. 383. Psilopogon Schimperi, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 447. Ps. Figarci, Figar. Ind. Sem. Hort. Gen. (1852), in Ann. Sc. Nat. Ser. III. xix. (1853) 370. Progonatherum tenue, Edgew. in Journ. As. Soc. Beng. (1853) 181. -Batratherum, Wall. Cat. n. 8828.

TEMPERATE HIMALAYA, from Kashmir, alt. 4-5000 ft. to Sikkim, alt. 5-11,000 ft.; the Khasia Hills and southwd. to the Nilghibis. Burma, Collett. Crylon, Thwastes.—Distrib. Tonkin, Afr. trop.

Except in the smaller size, hairy peduncies and rachis of the shorter spikes, small spikelets, and toothed tip of gl. I, there is little to distinguish this from some of the states of A. ciliaris. Hackel indeed says that these are very closely allied.

Sect. II. TRICHATHERUM, Hack. Joints of rachis of spike obliquely truncate. Awn 10 in. long, capillary, flexuous.

9. A. jubatus, Hack. Monogr. Androp. 358.

The CONCAN? Stocks.

Annual, decumbent, glabrous; stems slender, ascending, branching, 6-12 in. long. Leaves 1-2 by \(\frac{1}{2}\)-\frac{1}{2} in., lanceolate from a bonvolute amplexical base, acuminate, flat, flaccid, pubescent or villous; sheaths lax, pubescent, upper spathiform leafless; ligule short. Floral spathes 1\frac{1}{2}\)-\frac{1}{2}\ in., linear-lanceolate, membranous, green, euclosing the spikes, pubescent. Spikes binate on a common peduncle, a subsessile and a pedicelled, pedicel slender pubescent, fragile; joints about 4, half as long as the spikelet, and shorter pedicels of upper spikelet clavate, compressed, pectinately ciliate. Spikelets binate, a sessile and pedicelled at each joint, and a terminal male. Sessile spikelets \(\frac{1}{2}\) in., membranous, linear-lanceolate, 2-nerved, deeply inflexed in the middle line, tip 2-mucronate, margins hyaline; II as long, linear-lanceolate, laterally compressed, 1-nerved, keel scabrid; III shorter, linear, nerveless, glabrous; IV = \(\frac{1}{2}\) III, lanceolate acute, glabrous, with the immensely long awn attached to its base, palea 0. Pedicelled spikelets about \(\frac{1}{2}\) in., awnless:

UNDETERMINABLE SPECIES.

BATEATEERUM, Wall. Cat. 8827 (Andropogon minutissimus, Herb. Heyne) ia a dwarf or very immature state and unrecognizable.

41. ISCHNOCHLOA, Hook. f.

(Genus not in the clavis, p. 4.)

A small, slender, straggling, flacoid, leafy annual. Leaves ellipticlanceolate, acute at both ends. Spikes solitary, simple, shortly exserted from the uppermost leaf-sheaths; rachis very slender, linear, flattened, with thickened margins, inarticulate. Spikelets 1-fld., minute, binate, a sessile and a pedicelled, lanceolate, both awned and bisexual; callus minute, ciliate. Glumes 3 (III absent) I linear-oblong, subcoriaceous, 5-6-nerved, dorsally flattened, tip broadly hyaline truncate irregularly 2-toothed, margins incurved, keels ciliate; II oblong, keeled, obtuse or truncate, 3-nerved, ciliate towards the tip; IV much shorter, very narrow, cleft to the middle, lobes subulate; awn in the cleft, capillary, geniculate, palea 0. Lodicules cuneate. Stumens 3, anthers oblong. Styles short, free. Grain subfusiform, terete, grooved one side.

A remarkable genus, with the habit of Arthraxon (closely resembling A. micro-phyllus), next which it may be provisionally placed, but not nearly related to it, differing in the inarticulate flat ruchis of the simple spike, bisexual awned pedicelled spikelets, and absence of gl. III.

I. Falconeri, Hook. f. in Hook. Ic. Pl. t. 2466.

NORTH WESTERN HIMALAYA; growing amongst moss, Falconer.

Stems 6-8 in., very slender, sparingly branched, leafy to the tips, filiform; internodes concealed by the leaf-sheaths. Leaves $\frac{1}{2}-\frac{3}{4}$ in., flat, acute or acuminate; sheath deeply furrowed, glabrous; ligule a few hairs. Spikes $\frac{1}{2}-1$ in., very slender, green, peduncle capillary as long as the leaf-sheath; rachis exactly linear, flexnous, quite glabrous, not disarticulating at the transverse glabrous nodes. Spikelets $\frac{1}{10}$ in long, rather longer and broader than the internodes; gl. I with the 2 lateral (carinal) nerves only reaching the tip; II with a stout median nerve and 2 very slender lateral ones anastomosing with it below the tip.

42. THELEPOGON, Roth.

A coarse perennial grass. Leaves lanceolate, base cordate, amplexicaul. Spikes few or many, corymbosely fascicled, peduncled, lower whorled, upper distant; rachis flexuous, fragile; joints more or less deeply excavated. Spikelets solitary at the jounts, with the rigid pedicel only of an upper, ovoid, acute. Glumes 4, I thickly coriaceous, convex, beaked, transversely rugose ridged or tubercled; II sunk in the cavity of the joint, rigid, sparingly tubercled, acuminate; III shorter, hyaline, paleate, usually male; IV bisexual, hyaline, deeply bifid, with a long twisted awn in the sinus; palea narrow. Lodicules broad. Anthers 3, very long. Styles free, stigmas short. Grain narrowly oblong, free.

T. elegans, Roth. ex Roem. & Sch. Syst. ii. 788. Nov. Pl. Sp. 62; Hack. Monogr. Androp. 267. Andropogon Princeps, A. Rich. Tent. Fl. Abyss. ii. 471, t. 102. Rhiniachne Princeps, Hochst. ex Steud. Syn. Gram. 360 (in Syn.). Jardinea abyssinica, Steud. Syn. Gram. 360.

CENTRAL INDIA, the CONCAN and MALABAR.—DISTRIB. Afr. trop.

Stems 6 in. 3 ft., tufted and branching from the base, or woody as thick as a crow-quill below and geniculately branching upward; roots stout, rigid. Leaves 3-10 by \(\frac{1}{2}\) in., linear, acuminate, rather thin, and sheaths glabrous scabrid or bispid with tubercle-based hairs, margins denticulate; ligule very short. Spikes 1-3\(\frac{1}{2}\) in., peduncle slender, stiff; rachis compressed, much narrower than the spikelets, of upper spikelets tubercled; joints as long as the spikelets, subclavate, scaberulous, top orbicular cupped. Spikelets \(\frac{1}{2}\)-\(\fr

length; palea as long as the gl., oblong, acuminate, 2-nerved. Pedicel of arrested spikelets flat, scabrid.—Gl. III and its palea would appear to have exchanged their character of nervation. A curious gigantic state? collected by Ritchie at the Kola Nuddi Waterfall (in the Concan?) has the upper spikelets densely softly villous, gls. I and II thin hardly tubercled, the lower spikelets appear to be binate but are very imperfect.

43. LOPHOPOGON, Hack.

Small perennial densely tufted grasses. Icaves very narrow. Spikes very short, solitary 2-nate or fascicled on the ends of capillary branches, very fragile; joints very short, slender, tips cupular. Spikelets small, homogamous or heterogamous, 1-2-fid., 2-3-nate, one sessile, callus conical villous. Glumes 4, I and II chartaceous, I oblong, broadly truncate, irregularly 3-4-toothed, 7-nerved, dorsally convex; II longer than I, lanceolate, narrowed into a straight awn, 3-5-nerved, hispidly villous on the sides, and with tufts of hairs dorsally below the middle; III hyaline, oblong-lanceolate, acute or aristulate, ciliolate, 1-nerved, 1-2-androus or neuter, palea linear 2-nerved; IV nearly as long as III, fem. or bisexual and diandrous, linear-oblong, 2-fid, lobes setiform and margins hispidulous; awn in the cleft, much longer than the gls. tortuous and twisted; palea minute, quadrate, lobulate, 2-nerved. Lodicules O. Anthers narrow. Styles combined below, stigmas very long.—Species 2, Indian and a 3rd? Australian.

In L. tridentatus the lower spikelets sometimes form a whorl at the apex of the peduncle as in Germainia. In this species also the upper spikelet is usually male or neuter. Hackel suggests the probability of Retz's Andropogon incurratus (Obs. v. 21 non Trin.) from Tranquebar, Koenig, being a Lophopogon.

1. L. tridentatus, Hack. in Engl. & Prantl. Nat. Pflanzenfam. ii. II 56, Monogr. Androp. 254, t. i. f. 14; stem subsimple, spikes more or less closely sheathed. Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 201; O. Kuntze, Revis. Gen. i. 197. Andropogon tridentatus, Roxb. Fl. Ind. i. 257; Steud. Syn. Gram. 372. Saccharum tridentatum, Spreng. Syst. i. 283.—Gen. Nov. Wall. Cat. n. 8842.

The CONCAN and CANARA, Heyne, &c. CENTRAL PROVINCES, Khandua, Duthie.

Stem 4-6 in. Leaves 2-4 in., rigid, 3-nerved; sheath short, upper ventricose; ligule obscure, ciliate. Heads of spikes $\frac{1}{2}-\frac{1}{2}$ in.; sheaths ovoid, flattened, membranous, caudate-acuminate. Spikes $\frac{1}{2}-1$ in. Spikelets $\frac{1}{2}-\frac{1}{6}$ in., brown when dry; gl. I of lower spikelet dorsally naked, of upper with tufts of long bristles below the middle; II back and margins villous, with a pencil of hairs on each side about the middle.

- O. Kuntze, l.c. has two varieties: α . Wrightii, Nees mss., with red hairs at the base of gl. I., and β . Munroi, with none.
- 2. **E. Kingii**, *Hook. f.*; stem subcorymbosely branched above, spikes long-peduncled.

BEHAR; at Monghir, Herb. Hort. Calcutt.

Foliage and spikelets nearly as in *L. tridentatus*, but habit very different. The subcorymbose branches of the stem bear subulate leaves and capillary peduncles 1-2 in. long embraced by almost filiform sheaths with acicular tips. Spikes solitary or few together, 1 in. long, pale yellow-brown, fragile.—More materials are wauting for a trustworthy description of the inflorescence.

44. APLUDA, Linn.

A leafy perennial grass. Stems geniculately ascending from a creeping or decumbent base, sometimes scandent, paniculately branched. Leaves petioled, flat; sheaths of upper spathiform. Inflorescence of very many solitary small simple spikes, terminating the stem and branches, each enclosed in a special membranous peduncled spathe, together forming a leafy panicle. Spikes of one linear joint gibbously bulbous at the base, and jointed on the peduncle at the base of the spathe by a minute curved peducel; rachis (joint) smooth. Spikelets 3, a sessile 2-fld. bisexual with a pedicelled imperfect (reduced to a small gl.) at the base of the rachis, and a terminal male or neuter, rarely bisexual; sessile spikelet seated on the bulbous base of the rachis (callus of authors); gls. 4, I charge taccous convolute many-nerved margins not inflexed, II compressed 5-7-nerved dorsally gibbous keeled, III ovate-lanceolate hyaline male paleate, IV much smaller bisexual ovate paleate entire or 2-toothed, awned or not. Lodicules 2, cuneate. Stamens 3, anthers short. Styles free. Grain oblong, embryo large.

In the above description I consider what Hackel describes as the pedicel of the upper spikelet to be the rachis of the uninodal spike; and his callus of the sessile spikelet to be a bulbous inflation of the base of the rachis.

A. varia, Hack. Monogr. Androp. 196. A. aristata and mutica, Auct.—Apluda, Wall. Cat. n. 8760, 8761.

Throughout India and Burma, ascending the Himalaya to 8000 ft. CEYLON,

up to 4000 ft.—DISTRIB. E. trop. Asia. Mulaya, Australia, Ins. Pacific.

Stem 1-7 ft. or more, solid, as thick as a crow-quill below; branches fiexuous; roots wiry. Leaves 4-18 in., subbifarious, linear-lanceolate, cuspidately acuminate, base narrowed usually petioled, above and margins scaberulous, glaucous beneath, upper gradually shorter; sheaths glabrous, rarely hairy, upper shorter and dilated into sputhes with subulate tips; ligule short, rounded. Spathes of the fig. branches about 4 in. long, cymbiform, thin, many-nerved; of the spikes smaller, very variable in length, longer or shorter than their almost capillary peduncles. Spikes \(\frac{1}{2}\) in., greeu or pale violet. Sessile spikelet \(\frac{1}{2}\)-\(\frac{1}{2}\) in.—The following is Hackel's arrangement of the very unstable Indian varieties of this polymorphous plant. It is especially useful as approximately classifying its intricate synonymy.

Subsp. MUTICA, Hack.; gl. IV very rarely awned; I straight glabrous; II dorsally gibbous keel depressed above the gibbosity acute glabrous; panicle usually lax, ultimate fig. branchlets usually half as long as the sheath.—A. mutica, Linn. Sp. Pl. 82; Gærtn. Fruct. ii. t. 175; Lamk. Ill. t. 841, f. 1; Anderss. in Efvers. Vet. Akad. Stockh. (1855) t. 5, f. 6. A. gigantea, Spreng. Syst. i. 290. P.A. glauca, Schreb. Beschr. Græs. 99. A. geniculata, Roxb. Fl. Ind. i. 325. Andropogon glaucus, Retz. Obs. v. 20. Calaminea gigantea, Beauv. Agrost. 15, t. 23, f. 1.

Var. humilis; clusters of spikes distant, spathe of spike \(\frac{1}{4}\) in., sessile spikelet \(\frac{1}{1-\frac{1}{4}}\) in., callus \(\frac{1}{4}\) in., callus \(\frac{1}{4}\) in., callus \(\frac{1}{4}\) in., Cumingii, Buese ex de Vriese Pl. Reinw. 105. A. inermis, Regel in Act. Hort. Petrop. vii. (1880) 658. A. mucronata, Stoud. Syn. Gram. 404. Calamina humilis, Roem. \(\frac{1}{4}\) Schult. Syst. ii. 810.

Subsp. ARISTATA, Hack. gl. IV of sessile spikelet cleft to the middle; I chartaceous; II dorsally less gibbous, keel sometimes scabridly ciliate often 2-mucronate; panicle dense, ultimate fig. branchlets shorter than the spathes, clusters of spikes close or confluent. A. aristata, Linn.

Cent. ii. 7; Schreb. Beschr. Gres. 93. Lamk. Ill. t. 841, f. 1; Steud. Syn. Gram. 403; Roxb. Fl. Ind. i. 324; Dalz. & Gibs. Bomb. Fl. 303; Thw. Enum. Pl. Zeyl. 364; Trim. Cat. Ceyl. Pl. 108; Aitchis. Cat. Panjab Pl. 174; Duthie Fodd. Grass. N. Ind. 44, t. 29. A. Gryllus, Beauv. Agrost. 133 (cf. corrigend. in Suppl.) t. 23, f. 5.

Var. aristata proper; spathe rather shorter than its spike, sessile spikelet $\frac{1}{8}-\frac{1}{8}$ in., gl. I glabrous nerves scabrid, terminal spikelet = sessile, pedicelled spikelet minute. A. microstachya, Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 194. A. scabra, Anderss. l. c. 179. Ischæmum involucratum, Hb. Russ. in Wall. Cat. n. 8794 A.

Var. ciliata; tall, robust, fig. spathes glabrous or hairy, spathe half as long as its spike, sessile spikelet $\frac{1}{4} - \frac{1}{4}$ in., bulbous base $\frac{1}{12} - \frac{1}{10}$ in., gl. l and rachis puberulous, spathe glabrous or with tubercle-based hairs. A. ciliata, Anderss. l. c. 177-179.—

"Hardly a distinct variety," Hackel.

Var. villosu/a; spathe half as long as its spike, sessile spikelet \(\frac{1}{4}\) in., bulbous base of rachis \(\frac{1}{3}\) in., gl. I and pedicel scabrous-pubescent, terminal spikelet shorter than the sessile, pedicelled spikelet \(\frac{1}{3}\) in. ciliate. A. communis, Nees \(\frac{3}{6}\) Arn. in Nov. Act. l. c. 194; Anderss. l. c. 177, t. 5, 2. A. villosa, Schreb. Beschr. Gras. 98?—Wight Cat. n. 1743.

Var. rostrata; spike strongly incurved far exserted beyond the spathe, spikelet \(\frac{1}{4}\) in., callus \(\frac{1}{4-1}\) in. A. rostrata, Arn. \(\frac{2}{4}\) Nees l. c. 194. Wight Cat. n. 1714. —

Apluda, Wall. Cat. n. 8762.

45. VOSSIA, Wall. & Griff.

A gigantic floating grass. Spikes terminal, solitary or 2- (rarely 3-6-) nate, stout; rachis narrow, compressed, flexuous, jointed. Spikelets 2-fld., imbricate, 2-nate, longer than the subexcavate joints, one sessile by a very broad callus; the other smaller pedicelled. Glumes 4, I very broad, ovate, flattened, coriaceous, smooth, narrowed into a long rigid green tail; II chartaceous, ovate-lanceolate, acute, 3-nerved, keeled above; III hyaline, 2-nerved, paleate, male; IV hyaline, oblong, 3-nerved, tip ciliate, palea 2-nerved. Lodicules large, toothed. Anthers 3, long. Styles distinct, stigmas short. Grain unknown.

V. procera, Wall. & Griff. in Journ. As. Soc. Beng. v. (1836) 573, t. 23; Wall. Cat. n. 8878; Grant in Trans. Linn. Soc. xxix. 175, t. 116; Hack. Monogr. Androp. 270. V. cuspidata, Griff. Notul. iii. Index p. xii., Ic. Pl. Asiat. Index p. v. t. 153. Ischæmum cuspidatum, Roxb. Fl. Iud. i. 324; Kunth Enum. Pl. i. 516; Griff. Notul. iii. 70. I. ensiforme, Herb. Ham. ex Wall. Cat. l. c.

Jheels of Bengal, Silher and Assam .- Distrib. Afr. trop.

Stem 6-12 ft., spongy, as thick as the thumb, rooting at the lower nodes. Leaves 1-2 ft., linear, acuminate, hispidulous, midrib stout; sheath large; ligule densely ciliate. Spikes 6-8 in., nearly terete; rachis narrower than the gis., margina ciliolate; joints \(\frac{1}{2}\) in., and pedicels cupped at the tip. Spikelets 1-1\(\frac{1}{2}\) in. with the spreading ciliolate tail of gl. I, green, callus annular.—Hardly generically different from Ischamum.

46. ROTTROBLLIA, Linn. f.

Tall, annual or perennial grasses. Spikes few or many, subsolitary or panicled rarely racemose or panicled; rachis usually fragile, joints usually excavate at the tip. Spikelets 2-rarely 3-nate, one (rarely two)

sessile and both or one only perfect, the other pedicelled imperfect, with the pedicel often adnate to the joint. Sessile spikelets, glumes 4, I coriaceous, flat or slightly convex, obtuse or acute, rarely 1-2-awned; II thinner, keeled; III hyaline, neuter or male; IV hyaline, 1 or 3-nerved, usually paleate, palea usually 2-nerved. Lodicules 2, truncate. Stamens 3. Styles distant. Grain oblong or obovoid, subcompressed dorsally.—Species about 30, temperate and tropical.

I have followed Hackel for the most part in the disposition of the species of the first four sections of the genus. For my departure from him in the fifth see remarks under *Ophiurus* (p. 160).

- A. Sessile spikelets solitary in all the joints of the spike.
- Sect. I. Phacelurus, *Hack. Spikes* digitately racemed (rarely solitary), rachis fragile, tips of joints flat, not hollowed. *Spikelets* 2-fld.—Phacelurus, *Griseb.* (gen.)
- 1. R. speciosa, Hack. Monogr. Androp. 282; perennial, spikes solitary or alternate or subdigitately fascicled 2-3½ in. long, spikelets ½-¼ in. 1-fid., gl. I flat 11-13-nerved. Ischæmum speciosum, Nees ex Steud. Syn. Gram. i. 375. Andropogon speciosus, Steud. l. c. Vossia speciosa, Benth. in Journ. Linn. Soc. xix. (2881) 70; Duthie Grass. N.W. Ind. 18, Fodd. Grass. N. Ind. 32.

WESTERN TEMPERATE HIMALAYA, alt. 5500-9000 ft., from Kashmir to Garwhal, Royle, &c.

Stems tufted, 1-4 ft., stout or slender, simple above. Leaves 6-12 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., linear, hispid or glabrate, margins scabrid; sheath glabrous or margins above hairy; ligule a ciliate border. Spikes 3-6 in., rarely solitary, glabrous, green or purplish; joints about as long as the spikelets, subclavate, trigonous, angles ciliate. Spikelets lan eolate, glabrous; gl. I obtuse, tip oblique, margins narrowly inflexed, keels scaberulous; II navicular, acute; III lanceolate, 3-5-nerved; IV elliptic-lanceolate, 1-nerved.

- Sect. II. THYRSOSTACHYS, Hack. Spikes panicled, lower whorled, peduncled; rachis fragile, tips of joints hollowed. Spikelets 1-fld.
- 2. **R. Zea,** Clarke in Journ. Linn. Soc. xxv. (1889) 86, fig. 38; panicle thyrsiform or pyramidal, spikes smaller upwards, spikelets ½ in., gl. I scabrid 1-3-nerved. Hack. Monogr. Androp. 690. R. thyrsoidea, Hack. l. c. 283.

KHASIA HILLS, alt. 2-3000 ft., J. D. H. & T. T., Clarke. MUNNEPORE, alt. 3500 ft., Clarke. UPPER BURMA; at Camein on the Mogaung river, Griffith.

Stem tall, 6-8 ft., very stout, as thick as the forefinger below, erect, simple or sparingly branched, nodes silky. Leaves large, 2-3 ft. by 1-1½ in., linear, flat or complicate, glabrous, margins scabrid; sheaths subcompressed; ligule short, truncate. Paniels 10-20 in. long, long-peduncled, rachis very stout, strict. Spikes erectopatent, lower branched, sometimes distichously; rachis stout, flexuous or zigzag, joints about as long as the spikelets, subclavate, glabrous. Spikelets glabrous; gl. I obtuse, dorsally scabrid, 1-3-nerved, margins narrowly inflexed, keels scaberulous; II ovate, acute, 3-nerved; III lanceolate; IV oblong, obtuse.

Sect. III. Hemartheia, Hack. Spikes solitary or fascicled, compressed; joints coherent or subfragile, tips obliquely or transversely truncate, not hollowed. Spikelets of each pair similar, pedicel of upper usually adnate to the joint of the rachis.—Hemartheia, Br. (Gen.).

3. **R.** compressa, Linn f. Suppl. 114; rachis of spike coherent, sessile spikelets $\frac{1}{10-8}$ in., callus distinct, gl. I of sessile spikelets coriaceous obtuse or acute 7-9-nerved, gl. II of pedicelled acuminate or shortly awned 7-9-nerved.

Throughout the hotter parts of India, generally in wet places, Burma and CEYLON.—DISTRIB. Westwards to Spain and the Canaries, and in most warm climates.

Erect or decumbent below, usually branched throughout, leafy; nodes glabrous or pubescent. Leaves short or long, linear, acute, margins and sometimes the upper surface scaberulous; mouth of sheath lfairy. Spikes solitary or fascicled, 2\frac{1}{2}-5 in. long, slender, erect, rarely branching; gl. I of pedicelled spikelets subulate or narrowly lanceolate, tip scabrid.—A polymorphous grass, whose Indian varieties are

disposed of as follows by Hackel :-

Var. a. genuina, Hack. l.c.; stems creeping below, then erect, scandent, 5-20 ft. long (Roxb.), spikes slender solitary or 2-3-nate, spikelets 1-1 in., gl. I broad ovate-lanceolate obtuse not constricted below the tip. B. glabra, Roxb. Fl. Ind. i. 353; Wall. Cat. n. 8871 A. R. anceps & quarterna, Herb. Ham. ex Wall. l. c. B. C. Hemarthria compressa. Kunth Enum. i. 465 (in part); Gruh. Cat. Bomb. Pl. 233; Thw. Enum. Pl. Zeyl. 364; Trim. Cat. Ceyl. Pl. 107; Aitchis. Cat. Panjab. Pl. 172; Duthie Grass. N.W. Ind. 18, Fodd. Grass. N. Ind. 30. H. coromandelina, Steud. Syn. 358.—Common in India.—Hackel does not notice Roxburgh's description of this grass as scandent, and attaining 20 ft. in length.

Var. \$\mathcal{B}\$, fasciculata\$, Hack. l.c.; stem 2-5 ft. creeping, then erect, upper spikes usually fascicled longer stouter often curved, spikelets \$\frac{1}{2} + \text{in., gl. I}\$ of sessile constricted below the tip. R. altissima, Poir. Voy. Barb. ii. 105. R. compressa, Linn. f. Suppl. 114; Retz. Obs. iii. 12; Roxb. Fl. Ind. i. 354. R. fasciculata, Lamk. Ill. i. 204; Desf. Fl. Atlant. t. 36. R. spathacea, Ten. Fl. Nap. Prodr. p. xi. Lodicularia capensis, Nees Fl. Afr. Austr. 128. L. fasciculata, Beauv. Agrost. 108; Wight Cat. n. 1721. L. fastigiata, Herb. Beauv. (non Agrostogr.). L. laxa, Nees ex Steud. l. c. 358. L. peruvina, Meyen Reise, ii. 71. Lepturus fasciculatus, Trin. Fund. Agrost. 123. Hemarthria capensis, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1833) 248. H. caudiculata, Steud. l. c. 359. H. fasciculata, Kunth Revis. Gram. i. 153, Enum. i. 465; Benth. Fl. Hongk. 418; Hack. in Mart. Fl. Bras. ii. 111, 314, t. 72, f. 2; Duthie Grass. N.W. Ind. 13, Fodd. Grass. N. Ind. 30. H. laxa, Steud. l. c. 358. —Hemarthria, Wall. Cat. n. 8871 (in part).—Common especially on the borders of pools often climbing amongst bushes.

Var. 8. japonica, Hack. l. c. 288; leaves with setaceous tips, upper spikes subfascicled stout, spikelets 1-1 in., gl. I sessile hardly constricted below the subobtuse tip 7-11-nerved, of pedicelled lanceolate not subulate.—Hackel says of this Japan plant that "Wallich's n. 8868 B is exceedingly like it." But that number of

Wallich's Herb. is Ratzeburghia pulcherrima, and there is no B under it.

4. R. protensa, Hack. Monogr. Androp. 289; rachis of spike firm, sessile spikelet \(\frac{1}{2} \) in. lanceolate, callus obscure, gl. I subacute many-nerved, gl. II of pedicelled spikelet lanceolate narrowed into a long slender awn 1-3-nerved. R. repens, Roxb. mss. ex Wall. Cat. Hemarthria protensa, Steud. Syn. Gram. 359. \(\frac{7}{2} \) H. vaginata, \(B\)\"ihes Pl. Jungh. iii. 354 (ex Hack.).—Hemarthria, Wall. Cat. n. 8872, 8910.

ASSAM, BENGAL, SILHET, CACHAR and the KHASIA HILLS, in marshes.

P LACCADIVE ISLDS., A. B. Hume.

Stem 3-6 ft., erect from a decumbent base, stout, leafy, flowering from all the nodes. Leaves 3-12 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., linear-lanceolate, acuminate, narrowed from below the middle to the base, surfaces and margins smooth, glabrous; sheath glabrous or hairy. Spikes 4-8 in., slender, joints shorter than the sessile spikelets, top transversely truncate; pedicels adnate to the joints. Sessile spikelets linear-lanceolate; gl. I VOL. VII.

narrowed from the middle upwards; II more or less usually wholly adnate to the joint, IV very short or 0. Pedicelled spikelets, gl. I 7-nerved; II \(\frac{1}{2} - \frac{1}{2} \) in., keel excertric.—Very nearly allied to R. compressa. "The only Androp, grass in which fruiting spikelets are not detached, hence there can be no dissemination except from the whole spike," Hackel. The Laccadive Islds. specimens are very slender with narrow leaves and quite erect strict lanceolate finely acuminate spikelets, rather longer than the joints.

Var. Hamiltoniana; callus of sessile spikelets bearded with short hairs. ? R. Hamiltoni, Trin. mss. ex Steud. Nom. Ed. II. ii. 474. R. compress, Wall. Cat. n. 8870 A.C. R. compressa var. Hamiltoniana, Hack. Monogr. Androp. 288. Hemarthria Hamiltoniana, Steud. Syn. Gram. 358. Lodicularia Hamiltoniana, Ness ex Steud. l. c. 359.—Lower Gangetic Plain; Nathpur, Hamilton.—Referred to com-

pressa by Hackel, but I think nearer to protensa.

5. **R. longifiora**, Hook. f.; spikes shore, rachis firm, sessile spikeléts $\frac{1}{2}-\frac{1}{3}$ in lanceolate narrowed into a long point, callus obscure, gl. II rather longer subaristate, pedicelled spikelets like the sessile.

TENASSERIM; at Mergui, Griffith. Assam, Herb. Munro.

Stem 1-2 ft., erect, leafy, stout, spongy; nodes glabrous or pubescent. Leaves 3-6 by \(\frac{1}{2} \) in., linear-lanceolate from a rounded base, flaccid, smooth, glabrous, margins smooth; sheath inflated; ligule short, membranous. Spikes \(\frac{1}{2} \) in, sheathed below, stout, nearly \(\frac{1}{2} \) in. across the spikelets; rachis subtetragonous. Spikelets twice as long as the joints, the pedicelled rather longer and longer awned than the sessile; gl. II adnate to the joint; III of sessile spikelet oblong, obtuse, nerveless; IV like III, palea small. Lodicules quadrate, broader than long, membranous. Gl. IV of pedicelled spikelet narrower than the sessile, paleate, with imperfect stamens and pistil.—Resembles a very large state of R. protensa.

- Sect. IV. Peltophorus and Cœlorhachis, Hack. Spikes solitary or fascicled, fragile, terete or compressed; joints transversely (rarely obliquely) truncate, deeply hollowed, dorsally convex, ventrally excavate; pedicel of upper spikelet free or adnate to the joint of the rachis, tip hollowed. Peltophorus, Desv. (Gen.).
 - * Gl. I of sessile spikelets broadly winged.
- 6. R. Myurus, Benth. in Journ. Linn. Soc. xix. (1881) 68; perennial, gl. I of sessile spikelet panduriform dilated above the middle into an orbicular wing, and towards the base into two auricles joined by a transverse ridge. Hack. Monogr. Androp. 290. Manisuris Myurus, Linn. Mant. ii. 300; Desv. ex Beauv. Agrost. 14, t. 1; Rottl. in Neue Schrift. Nat. Fr. Berl. iv. (1803) 191; Roxb. Corom. Pl. ii. 10, t. 117, Fl. Ind. i. 351; Schreb. Beschr. Graese, t. 43; Kunth Enum. Pl. i. 470; Griff. Notul. iii. 100; Miq. Fl. Ind. Bat. iii. 410. Peltophorus Myurus, Desv. in Nouv. Bull. Soc. Philom. ii. (1810) 188, Journ. Bot. i. (1813) 73; Beauv. Agrost. 119, t. 21, f. 11; Wall. Cat. n. 580; Wight Cat. n. 1725, Herb. n. 3071. Ischæmum, Myurus & Ægilops sanguinea, Herb. Linn.

The Deccan Peninsula, Heyne, Wight, &c., in dry places.

Stem creeping and rooting, with ascending compressed branches 6-28 in. high. Leaves 2-6 in., spreading, linear, acute, flat, glabrous; sheath compressed, margins ciliate; ligule short, ciliate. Spikes 1-2 in., solitary, terminal and axillary, shortly exserted; joints scaberulous, shorter than the spikelets, excavate on each side leaving a pore between the spikelet and joint. Sessile spikelets 15 in., brown, callus minute; gl. I scaberulous, 5-nerved, wing scarious; II ovate, acute, 3-nerved; III oblong, obtuse, empty; IV lanceolate, nerveless; palea obsolete. Pedicelled spikelets; gl. I oblong, obtuse, 5-nerved, winged on one side; II navicular, 3-nerved; III 3-nerved, paleate; IV oblong, obtuse, male; pedicel free or adnate to the joint.

7. **R. acuminata**, Hack. Monogr. Androp. 291; annual, spikes short, gl. I of sessile spikelet broadly ovate acuminate winged above the middle, coriaceous below it with 3 to 6 dorsal transverse echinulate or warted ridges.

The DECCAN PENINSULA, G. Thomson; N. Canara; Carwar, Talbot.

Stem 3-12 in., ascending from a creeping base, compressed, leafy. Leaves flaccid, lower 2-3 in., linear-lanceolate from a narrow base, acuminate, upper shorter spreading and recurved; sheath turgid, compressed, keeled, mouth hairy; ligule short, truncate, glabrous. Spikes 1-2 in.; joints subclavate, much shorter than the sessile spikelets, base not excised. Sessile spikelets \(\frac{1}{4}\)-\frac{1}{2}\) in., callus obscure; gl. I 5-nerved in the narrow coriaceous part between the wings; II elliptic-lanceolate, acute, 3-nerved; III elliptic, paleate, male; IV short, oblong, obtuse; palea small, 2-lobed, nerveless. Pedicelled spikelet; gl. I winged on one side, 5-nerved, base not tubercled; II 3-nerved; IV male, lanceolate, many times longer than the joint.

Var. Stocksis; diffusely branched from the root, gl. I of pedicelled spikelet 1 in. subulate-lanceolate erect or recurved narrowed into a slender scaberulous awn not or obscurely winged.—Malwar, Stocks.—The long gls. of the pedicelled spikelets give this variety a very different appearance, but intermediates occur, and the specimens

were mixed with those of R. acuminata proper.

8. B. divergens, Hack. Monogr. Androp. 293; annual, spikes short, gl. I of sessile spikelet crossed below the middle with echinulate ridges ovate 2-mucronate or 2-aristate with broad hyaline wings above the middle. Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 195.

EAST INDIES, Huegel. The CONCAN and CANABA; Belgaum, Ritchie; Satara

and Mahableshwar, Lisboa.

Stem 4-10 in., erect or ascending, slender, terete, nodes 2-3 all with 2-nate flowering branches. Legges 1½-1½ in., narrowly linear, bairy beneath and on the margins; sheath compressed, naked, hairy; ligule short, membranous, rounded. Spikes about ¾ in., slender, erect, pale; joints shorter than the spikelets, subclavate, excised, outer margins of the cavities ciliate. Sessile spikelets ¼ in., broadly oblong, dorsally with 7 lines of small pits (Haskel) or rugose with long or short transverse tubercled or echinate ridges or crests, mucros or awns erect scabrid sometimes as long as the spikelet; II shorter, ovate, acute, keeled, 3-nerved, III broadly ovate, nerveless, empty; IV=III, ovate-oblong, obtuse, nerveless. Pedicelled spikelets lanceolate; gl. I smooth, 5-nerved, broadly inflexed on one side with a winged keel, on the other produced into a mucro; II lanceolate, acute, keel winged; pedicel adnate.—The ridges on gl. I of the sessile spikelet are very variable, and are sometimes replaced as it were by vertical rows of incurved spinules on the nerves.

9. **B. Talboti**, *Hook. f.* (non Lishoa); annual, leaves linear, spikes solitary short, gl. I of sessile spikelet lanceolate narrowed into a slender scabrid awn, and with 3 transverse cilicate ridges towards the base broadly winged above it, pedicel of upper spikelet adnate to the joint of the rachis.

GOA DISTRICT, Talbot.

Stems 6-8 in., slender, erect or base geniculate, subsimple. Leaves 2-3 in., narrow, smooth; sheath glabrous; ligule short, membranous. Pedunoles 2-3 in., very slender, flexuous. Spikes 1 in. diam., green, joints very short, tumid, excavate opposite the spikelet, top broad, cavity very large, margins thick hispidulous. Spikelets closely imbricating, 1 in. long including the awn; callus annular, ciliolate; gl. I of sessile spikelet many-nerved on the coriaceous disk; II much shorter, byaline, ovate-oblong, acute, 1-nerved; III broadly oblong, tip rounded, faintly 3-nerved, male; IV small, oblong, obtuse, nerveless, pales as long nerveless. Pedicelled

spikelets as long as the sessile; gl. I very unequally winged, dorsally smooth, awn as in the sessile; pedicel wholly adnate to the joint of the rachis.

10. R. Clarket, Hack. in Æstr. Bot. Zeitschr. xli. (1891) 8; annual, leaves lanceolate base cordate, spikes solitary short, gl. I of sessile spikelet orbicular-oblong dorsally gibbous and scabrid below the middle winged above it, tip notched, pedicel of upper spikelet quite free. R. gibbosa, Hack. ex Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 195. R. Talboti, Lisboa mss. l. c.

BEHAR, on Parusnath; and Hazaribagh, in Chota Nagpore, alt. 2000 ft., Clarke.

BOMBAY; N. Kundra District, Talbot, Lisboa.

- Stem 6-8 in., branched, erect, compressed. Leaves 3-5 by \(\frac{1}{2}\) in., acuminate, glabrous or hairy; sheath ciliate; ligule of hairs. Spikes \(\frac{1}{2}\)-1 in., erect, rachis fragile, joints clavate shorter than the spikelets, tips ciliolate, side not hollowed. Spikelets \(\frac{1}{10}\)-\frac{1}{2}\) in., closely imbricating. Gl. I of sessile spikelet with a coriaceous 3-5-nerved disk and ciliate hyaline wings; II much smaller, ovate, 1-nerved; III ovate, obtuse, hyaline, nerveless; IV much smaller, broadly oblong, obtuse, nerveless, sides incurved, palea like the gl. nerveless. Pedicelled spikelet like the sessile, but smaller and less gibbous; pedicel pyriformly clavate, truncate, top scaberulous.
- ** Gl. I of sessile spikelet winged at the tip only or narrowly on the margins.
- 11. R. exaltata, Linn. f. Suppl. 114; annual, leaf-base narrow rounded tip setaceous, gl. I of sessile spikelet very coriaceous about as long as the joint obtuse hardly margined or winged dorsally flat smooth, pedicels of upper spikelet shorter than the joints. Kunth Enum. Pl. i. 466; Hack. Monogr. Androp. 294; Steud. Syn. Gram. 361; Roxb. Corom. Pl. ii. 30, t. 157, Fl. Ind. i. 354; Grah. Cat. Bomb. Pl. 233; Thw. Enum. Pl. Zeyl. 364; Trim. Cat. Ceyl. Pl. 107; Aitchis. Cat. Panjab. Pl. 172; Duthie Grass. N.W. Ind. 17; Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 196; Mig. Fl. Ind. Bat. iii. 406; Br. Prodr. 206; Benth. Fl. Austral. vii. 513; Baker Fl. Maurit. 457; Wall. Cat. n. 8875; Wight Cat. n. 1724, Herb. n. 3286. R. arundinacea, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 444; Steud. l. c. 362. R. denudata, Steud.; Mig. l. c. 408. R. gymnorhiza, Herb. Ham. ex Wall. Cat. n. 8875. R. hispida, Herb. Roxb. R. setosa, Presl Rel. Hænk. i. 329. Ophiurus appendiculatus, Steud. l. c. 359. Stegoasia cochinchinensis, Lour. Fl. Cochinch. 51.

Plains and lower hills of India, from the N.W. Provinces to ASSAM and BURMA (ascending the HIMALAYA in Garwhal to 7.00 ft.), and southward to Travancore and CEYLON. ANDAMAN ISLDS., Prain.—DISTRIB. China, Malaya, Australia, Africa.

Stems 6-10 ft., stout, erect, spongy within, as thick as the little finger below and hispid. Leaves 6-24 by \(\frac{1}{2}\)-1 in., linear-lanceolate, setaceously acuminate, scabrid or hispid above, margins scabrid; sheath hispid with tubercle-based hairs or glabrate. Spikes 3-6 in., stout, cylindric below, much narrowed with imperfect spikelets above; joints smooth, scaberulous. Sessile spikelets \(\frac{1}{2}\)-\frac{1}{2} in.; gl. I ovate-oblong, 2-fld., keels scaberulous narrowly winged, entire or emarginate; II broadly ovate, chartaceous, convex, 9-11-nerved, keel scabrid; III elliptic, 3-nerved, male, margins inflexed; IV shorter, convex, ovate, acute or mucronate. Pedicelled spikelets with the pedicel usually adnate by one margin to the joint, 1-2-fld. or neuter.

Var. robusta; leaf-base more cordately confluent with the sheath, spikes stouter below, slender above the middle, spikelets in upper half distichously imbricate longer than the joints, fertile nearly to the tip, pales of gl. IV suricled at the base.—Malabar and at Palameotta, Wight Herb. n. 3286; Wall. Cat. n. 8875 E. Poons,

Woodrow.

12. R. nigrescens, Thw. Enum. Pl. Zeyl. 364; leaf-base cordate, spike fragile, gl. I of sessile spikelet ovate-oblong very obtuse or 3-lobulate dorsally tessellately foveolate obscurely 2-winged in the upper third or tip. Hack. Monogr. Androp. 296; Trim. Cat. Ceyl. Pl. 107.

CEYLON; Central Province, alt. 4000 ft., Thwaites.

Stem tall, suberect, slender, glabrous. Leaves 4-8 in., linear-lanceolate, glabrous or sparsely hairy, margins scabrid, base ciliate; sheath glabrous or sparsely hirsute; ligule rounded, ciliate. Spikes 2-3 in., solitary or 2-nate, axillary and terminal; joints as long as the spikelet, stout, margins smooth. Sessile spikelets in., ovate-oblong; gl. I ovate, 9-nerved, wings scarious; II elliptic, obtuse, gibbous, keel winged below the tip; III hyaline, oblong, obtuse, paleate, nerveless; IV elliptic, obtuse, emarginate. Pedicalled spikelets; gl. I smooth, striate, winged above on one side, 7-9-nerved; II 5-nerved, keel excentric, winged; III and IV as in the sessile spikelet; pedicel adnate to the joint.

13. **B. striata**, Nees ex Steud. Syn. Gram. 361; leaf-base narrowed, spikes fascicled, often on very long peduncles, gl. I of sessile spikelet oblong-lanceolate shortly winged below the tip dorsally smooth with 4-6 often interrupted grooves below the middle. Hack. Monogr. Androp. 301.—Wall. Cat. n. 8876, 8877.

SIERIM HIMALAYA, alt. 1-4000 ft., J. D. H., &c. SILHET and the KHASIA

HILLS, Wallich, &c. BURMA and SINGAPORE, Wallich, &c.

Stem 3-4 ft., slender, thickened under the spikes, smooth, branched above. Leaves 2-4 ft. by \(\frac{1}{2} - 2 \) in., linear-lanceolate, setaceously acuminate, flat, midrib broad; sheaths glabrous, upper spathiform; ligule very short, membranous. Spikes 1-2 in., pale, slender, terete, glabrous. Sessile spikelets as long as the joints; callus annular, glabrous; gl. I obtuse, convex, many-nerved within, keels smooth; II chartaceous, ovate, subacute, acutely keeled, 1-nerved; III ovate, acute, hyaline, nerveless, paleate; IV ovate, faintly 1-nerved. Pedicet of upper spikelet linear, flattened, free or \(\frac{1}{2} \) or wholly adnate to the joint, tip hollowed, circular or compressed. Hackel has two subspecies.

Subsp. genuina; leaves 1-2 ft. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., spikes in a simple lax panicle, joints of rachis scaberulous, sessile spikelets \(\frac{1}{2}\) in., pedicelled spikelets of one long obtuse glume winged on one side.—Of this there are two vars. a. glabrior, stems and surfaces of leaves quite glabrous, margin of leaves and sheaths cliate.—Singapore and Tavoy; and \(\theta\). pubescens, stem above and surfaces of leaves pubescent.—

Khasia Hills.

Subsp. khariana; stem very tall much branched, leaves 3-4 ft. by 1-2 in., spikes 1-1\frac{1}{2} in. in a compound panicle; joints smooth, sessile spikelets \frac{1}{2} in., gl. I more broadly winged, pedicelled spikelet \frac{1}{2} in., oblong. R. khasiana, Munro mss.—Sikkim and the Khasia Hills.

14. R. glandulosa, Trin. in Mem. Acad. Petersb. Ser. 6, ii. (1833) 250; perennial, spikes fragile, sessile spikelets ovate-lanceolate, gl. I narrowly winged in the upper third, dorsally scaberulous, margins below with on each side 5-7 upcurved mucros or tubercles. Hack. Monogr. Androp. 302; Miq. Fl. Ind. Bat. iii. 408. Cœlorachis muricata, Brongn. in Duperr. Voy. Bot. i. 65, t. 14. Ophiurus muricatulus, Steud. in Zoll. Syst. Verz. 57, Syn. Gram. 360.—Rottboellia?, Wall. Cat. n. 8887 B.

BURMA, Wallich. MALAY PENINSULA; Singapore, Wallich; Malacca, Griffith;

Perak, King's Collector; Pahang, Ridley .- DISTRIB. Java, Philippines.

Stein 3-8 ft., tall, stout, branched, nodes pubescent or bearded. Leaves 2-3 ft. by 1-1 in., linear, caudate-acuminate, base usually fimbriate, margin scabridly serrulate; sheath bearded at the mouth; ligule densely hairy. Spikes many, 21-4 in., slender, terete, pale or yiolet. Seesile spikelets 1-1 in., 1-fid., rather shorter than the glabrous joints; gl. I flat, obtuse, dorsally scaberulous; II charta-

ceous, elliptic-lanceolate, ciliolate; III ovate-oblong, obtuse; IV hyaline, 3-nerved; palea truncate, nerveless. Pedicellet spikelets reduced to a solitary gl. winged on one side, rarely with a second; pedicel adnate to the joint of the rachis.—A solitary specimen of a closely allied, I think, undescribed, species from Rangoon, McLelland, has caudate acuminate leaves, solitary spikes, sessile spikelets longer than the joints, gl. I narrowly oblong, margins smooth.

15. E. Helferi, Hook. f.; perennial, spikes solitary fragile subsessile in the sheaths, joints very short pyriform, sessile spikelets longer than the joints, gl. I ovate obtuse narrowly winged above the middle, back and sides smooth.

TENASSERIM, Helfer.

Stem 1-2 it, slender, erect, from a nodose stock, sparingly branched above; modes faintly bearded. Leaves 1-2 ft. by \(\frac{1}{2}\)-\frac{1}{2}\) in., erect, linear from a hardly narrowed base, finely acuminate, hairy on both surfaces; sheath glabrous, bearded at the tip. Spikes 1-4 in., slender, erect; joints \(\frac{1}{3}\) in., excavate on one side, base shortly hairy. Spikelets \(\frac{1}{2}\) in.; gl. I broadly ovate, narrowed suddenly above the middle, smooth, glabrous, or slightly pubescent on the sides below, wings serrulate; II ovate, acuminate, chartaceous, 1-nerved, keeled, faintly obliquely winged above, III broadly ovate, obtuse, hyaline, faintly 3-nerved, palea small 2-toothed; IV ovate, obtuse or subacute; palea broad, truncate, 2-nerved. Pedicel of upper spikelet longer than the joint, linear, flattened, strongly 2-nerved, ciliolate at the base; spikelet reduced to a minute ovate glume.

B. Sessile spikelets geminate in all but the uppermost joints of the spike.

Sect. V. MNESITHEA, Kunth (genus).

16. R. perforata, Roxb. Pl. Corom. ii. 43, t. 182, Fl. Ind. i. 356; leaves very narrow, spikelets glabrous, pedicelled spikelets reduced to a minute gl. R. Lævis, Retz. Obs. iii. 11; Steud. Syn. Gram. 362. Ophinrus perforatus, Trin. in Mem. Acad. Petersb. Ser. 6, ii. (1833) 246; Hack. Monogr. Androp. 319. O. Lævis, Benth. in Journ. Linn. Soc. xix. (1881) 69; Trim. Cat. Ceyl. Pl. 107; Duthie Grass. N.W. Ind. 17, Fodd. Grass. N. Ind. 29; Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 193. Mnesithea lævis, Kunth Revis. Gram. i. 154, Enum. Pl. i. 466, Suppl. 375, t. 18, f. 3; Thw. Enum. Pl. Zeyl. 364; Wall. Cat. n. 8873; Wight Cat. n. 1722; Aitchis. Cat. Panjab. Pl. 172. Hemarthria? perforata, Kunth l.c. 453, Enum. i. 465. Diperium cylindricum, Desv. Opusc. 76, t. 6, f. 3. Thyridostachyum læve, Nees in Lindl. Introd. Nat. Syst. Ed. II. 379. Ægilops cuneata, Herb. Roxb.

Throughout India, from the Indus to Burma and southward to CEYLON.—

Distrin. Atighan., Java.

Stem 2-4 ft., rather slender, simple or branched above; nodes few. Leaves 6-30 by \$\frac{1}{2}\$ in., flat (conduplicate in vernation), linear from a narrow base, glabrous or base hairy, upper acute, lower obtuse, margins scaberulous; sheath terete; ligule very short. Spikes 4-8 in., shortly exserted, joints semi-cylindric, excavate on opposite sides with the pedicel of the imperfect spikelets between the opposite fertile spikelets. Spikelets \$\frac{1}{2}\$ in.; gl. I oblique, smooth or pitted above the base.

17. **2. merguensis**, *Hook. f.*; leaves $\frac{1}{4}$ in. broad, spikelets glabrous, pedicelled spikelet minute imperfect.

TENASSERIM; Mergui, Griffith, Helfer.

Habit of R. perforata, but at once distinguished by its greater size, and broad leaves which attain an inch in breadth with the tip finely acuminate, base rather narrowed, margins ciliate below the middle or towards the base only, both surfaces glabrous; sheath with glabrous or ciliate margins. Spikes 2-3 in., long peduncled; top of peduncle slightly clavate; joints \(\frac{1}{2} \) in., about as long as the spikelets, clavate, quite smooth. Sessile spikelets ovate-oblong, winged at the top, quite smooth or with a few linear impressed pits, margins naked or obscurely ciliate.

18. R. geminata, Hack. in Estr. Bot. Zeit. vli. (1891) 48; gl. I of sessile spikelets hirsute below with tubercle-based hairs.

MALAY PENINSULA; Pahang, Ridley.

Stems upwards of 2 ft. high, sparingly branched and flowering above; nodes hearded with reflexed hairs. Leaves 12 by $\frac{1}{8}-\frac{1}{8}$ in., linear, acuminate, rigidulous; sheaths appressed, mouths bearded; ligule short, membranous. Spikes about 2½ by ½ in., green, fragile; joints about ½ in., shorter and as broad as the spikelets, clavate, dorsally convex, ventrally and the tops deeply hollowed. Spikelets ½ in., separated by the narrow pedicel of the withering upper spikelets, dimidiate-ovate, glabrous, callus annular; gl. I coriaceous, acuminate, narrowly winged at the top on each side, margins narrowly inflexed, nerves many very slender, hairs white; II as long as I, ovate, subulate-acuminate, keeled, chartaceous; III shorter, hyaline, ovate, acuminate, empty, nerves 0; IV 1-nerved; palea like its gl.—Description from Hackel; I have not seen it.

UNDETERMINABLE SPECIES.

R. VILLOSA, Poir. Encycl. vi. 313; is, according to Hackel (Monogr. Androp. 313), probably an Ischæmum or Andropogon.

47. MANISURIS, Sw.

Annual, erect, much branched grasses. Leaves cordate at the base. Spikes terete, solitary, axillary and terminal, peduncles often confluent in a leafy spiciform panicle; rachis fragile; joints short, deeply excavate, tips with 2 pits. Spikelets 1-2-fld., in dissimilar pairs, one globose, sessile, bisexual; the other ovate, pedicelled, neuter, pedicel adnate to the joint of the rachis. Sessile spikelet; glumes 4, I hard, globose, foveolate, with an oblong opening opposite the rachis; II chartaceous, immersed in the cavity of I and filling the opening; III hyaline, empty; IV and its palea hyaline. Lodicules 2, broadly cuneate. Anthers minute. Styles free, stigmas short, exserted from the opening in gl. I. Grain subglobose.—Species 2, tropical.

1. M. granularis, Linn. f. Nov. Gram. Gen. 37, f. 7, fig. 4-7; sessile spikelets globose deeply pitted smooth between the pits, gl. II 1-nerved. Sw. Prodr. Veg. Ind. Occ. 25 (partim), Fl. Ind. Occ. i. 186; Gærtn. Fruct. ii. 468, t. 175; Beauv. Agrost. 119, t. 21, f. 10; Roxb. Pl. Corom. iii. 11, t. 118; Kunth Enum. Pl. i. 469; Hack. Monogr. Androp. 314; Steud. Syn. Gram. Grah. Cat. Pl. Bomb. 234; Dalz. & Gibs. Bomb. Fl. 300; Grif. Notul. iii. 101; Thw. Enum. Pl. Zeyl. 364; Trim. Cat. Ceyl. Pl. 107; Duthie Grass. N.W. Ind. 18, Fodd. Grass. N. Ind. 29, t. 46; Lisboa in Journ. Bomb. Soc. Nat. Hist. vi. (1891) 196; Benth. Fl. Austral. vii. 511; Mig. Fl. Ind. Bat. iii. 409; Griseb. Fl. Brit. W. Ind. 557; Doell. in Mart. Fl. Bras. ii. II. t. 46; Wall. Cat. n. 8879; Wight Cat. n. 1726. M. polystachya, Beauv. Fl. Owar. & Ben. i. 24, t. 14. M. hirta, Herb. Russ. ex Wall. Cat. l. c. Cenchrus granularis, Linn. f. Mant. ii. App. 575.

Throughout the hotter parts of INDIA, from the Panjab eastward to Burma, and

southward to CEYLON. - DISTRIB. Most tropical countries.

Stem 1-2½ ft. and leaves softly hairy, leafy to the top, as thick as a crow-quill. Leaves 4-10 by $\frac{1}{2}$ -½ in., flaccid, flat, acuminate; sheaths hirsute, inflated; ligule a raised ciliate margin. Spikes $\frac{1}{2}$ -1 in.; peduncle filiform. Sessile spikelets $\frac{1}{15}$ in. diam., superposed like minute beads on the rachis, and each as it were bracteate by the upper spikelet of the pair below it.

2. M. porifera, Hack. in Estr. Bot. Zeitschr. xli. (1891) 48; sessile spikelets broadly oblong truncate deeply broadly pitted, gl. I 5-nerved between transverse longitudinal ridges, II 3-nerved.

SIKKIM HIMALAYA; Dikeeling, alt. 3000 ft., Clarke. TENASSERIM, Helfer.

Habit and foliage, &c. of M. granularis. Spikelets $\frac{1}{12} - \frac{1}{10}$ in., brownish; callus smooth or foveolate; gl. I excised at the base on both sides, leaving a rounded porte between it and the rachis.—There is a specimen of this in Herb. Wight, without name or locality.

48. OPHIURUS, Gærtn.

Annual or perennial grasses. Spikes solitary or fascicled, terete. fragile; joints excavate, top concave. Spikelets 2-fld., solitary and sessile in the joints (with no upper or pedicel of one), not awned. Glumes 4, I thickly coriaceous, convex, obtuse; II almost membranous, concave, keeled; III elliptic, obtuse, hyaline, faintly 2-nerved, margins infolded, paleate, male; IV as long as III, oblong, obtuse, -nerved, paleate bisexual, palea narrow; IV oblong, obtuse. Lodicules 2, cuneate. Stamens 3. Grain oblong, free.—Species one or two. Tropical Asiatic and African.

Ophiurus, as defined by Hackel and Bentham, is an artificial genus, of which the original species, O. corymbosus, has solitary sessile 2-fld. spikelets on each joint of the spike, with no obvious traces of a second, by which character is differs from Rottboellia. Of other Indian plants referred to it, O. perforatus (Rottboellia perforata, Roxb.) has 2 sessile 1-fld. spikelets on each joint of the spike, with a long interposed pedicel of a second perfect or imperfect one. It is the genus Massithea of Kunth. Two admitted species of Rottboellia have the same structure as O. perforatus, namely, R. hirsuta, Forsk., and R. geminata, Hack. These three should form either a separate genus (Massithea), or a section of Rottboellia, which latter course I have adopted. Hackel describes the joints of O. corymbosus as being thickened on one side by the presence of the confluent pedicel of a second spikelet, but I find no trace of this (nor can Dr. Stapf), and he describes R. perforatus as with one sessile spikelet on each joint, or with two on the lower joints only; but I find that in all the specimens two sessile spikelets is the normal condition almost throughout the spikes, the uppermost joints alone having but one.

O. corymbosus, Gwertn. f. Fruct. iii. 4, t. 181, f. 3 a (Ophiuros); Kunth Enum. Pl. i. 464; Hack. Monogr. Androp. 317; Steud. Syn. Gram. 359; Wall. Cat. n. 8874; Wight Cat. n. 1723; Duthie Grass. N. W. Ind. 17, Fodd. Grass. N. Ind. 29, t. 55; Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 193; Benth. Fl. Austral. vii. 512. Rettboellia corymbosa, Linn. f. Suppl. 114; Rowb. Pl. Corom. ii. 42, t. 181, Fl. Ind. i. 355; Grah. Cat. Bomb. Pl. 233. R. punctata, Retz. Obs. iii. 11. Ægilops exaltata, Linn. Mant. ii. App. 575; Retz. l. c. ii. 27.

Dry hills, ascending to 3500 ft. in the HIMALAYA and KHASIA HILLS, and southward to the DECCAN PENINSULA (not in Ceylon).—DISTRIB. Toukin, Australia.

Perennial. Stems erect from a tuberous base, 5-6 ft., as thick as a goose-quill

below, solid, branching upwards, leafy throughout. Leaves $\frac{1}{2}-2$ ft. by $\frac{1}{2}-1$ in., flat (convolute in vernation), linear-lanceolate from a rounded base, finely acuminate, hairy above, margins spinulose; sheaths short, terete, upper leafless; ligule very short. Spites corymbosely fascicled, 2-5 by $\frac{1}{12}$ in. diam., erect, often in very dense fascicles, shortly peduncled; joints as long and broad as the spikelets, tips obliquely truncate. Spikelets ovate-oblong, obtuse, glabrous; gl. I smooth or scrobiculate, at length recurved.

49. RATZEBURGIA, Kunth.

A tufted slender perennial grass. Spikelets 1-fld., superposed in opposite pairs on a slender simple compressed subfragile spike, each pair sessile on a joint of the rachis, dorsally strongly compressed and appressed face to face (looking like one), rachis prolonged along the margins of the pairs on one side, and with the rachilla of a neuter along the opposite edges. Glumes 4, I thickly coriaceous, flat, oblong, deeply pitted, terminated with 2 erect coriaceous wings, margins strongly tubercled; II thinly coriaceous, lanceolate, acute, glabrous; III oblong, obtuse, hyaline, epaleate; IV smaller, epaleate. Lodicules obliquely quadrate. Anthers 3, short. Stigmas long.

R. pulcherrima, Kunth Revis. Gram. ii. 487, Enum. Pl. i. 468; Wall. Pl. As Rar. iii. 253, t. 273 (Aikinia), Cat. n. 8868; Hack. Monogr. Androp. 321. Ophiurus auriculatus. Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1833), 246. Aikinia elegans, Wall. l. c.

Burma; at Paghan and the Petroleum Wells, Wallich; Upper Burma, Collett. Stoloniferous; stem 6-18 in., geniculate and leafy below. Leaves 1-3 in., narrow, flat, margins thickened, tip rounded; sheath compressed; ligule short. Spike 1-2 in., ½ in. broad; pedupele very slender with 2-3 long-sheathed leaves below; joints and pedicels of neuter alike, incurved, obtusely angled, bearded along the inner angle and the hammer-headed top. Spikelets about ½ in.; wings of gl. I earlike, sublobed.

50. ELIONURUS, Humb. & Bonpl.

Aromatic grasses. Spikes solitary, subsimple, clothed with silky hairs, rachis flattened, jointed, fragile. Spikelets 2-nate, a sessile and pedicelled; joints compressed, margins thickened, tips obliquely truncate. Sessile spikelets dorsally compressed, 1-fld.; glumes 4, I coriaceous, entire or 2-fid, embracing II by its margins; II narrower, membranous; III hyaline, empty, paleate or not; IV small, hyaline, paleate or not, awn 0. Lodicules obliquely-quadrate. Anthers 3, short. Styles short, free. Gruin narrow, plano-convex, free.—Species about 15, tropical and subtropical.

Hackel observes that Elionurus differs from Rottboellieæ and agrees with Enandropogoneæ in the entire sessile spikelet falling away with the joint, whereas in Rottboellieæ, gl. I is removable and II and III persistent in the hollow of the joint. The Aromatic oil of Elionurus is contained in the glumes.

1. E. Royleanus, Nees ex A. Rich. Tent. Fl. Abyss. ii. 471; annual, dwarf, spikes corymbose each sheathed, gl. I of sessile spikelet lanceolate narrowed into a 2-fid beak, margins with penicillate tubercles, III and IV epaleate. Hack. Monour. Androp. 343; Duthie Grass. N. W. Ind. 17, Fodd. Grass. N. Ind. 28, t. 54. E. Grisebachii, Schmidt Beitr. Fl. Ins. Cap. Verd. 154. Rottboellia elegantissima, Hochst. & Steud. ex Steud. Nom. Ed. II. ii. 474. Andropogon elegantissimus & Grisebachii, Steud. Syn. Gram. 364, 365. Ratzeburgia Schimperi, Steud. Nom. l. c. 439.

UPPER GARGETIC PLAIN, Royle; Agra and Ettawah, Duthie; Delhi, Clarke.-

DISTRIB. Arabia, Abyssinia, Cape Verd Islds.

Stems 4-12 in., slender, leafy, geniculate. Leaves 4-10 in., narrow, flat or convolute, glabrous or sparsely hairy, base fimbriate; lower sheaths terete, upper spathiform; ligule very short. Spakes 1-2 in., erect, clustered towards the top of the stem, stout, green or purple, each enclosed in a long narrow flattened acute sheath; joints bearded below the tip. Sessile spikelets \(\frac{1}{2}\) in., erect; callus densely bearded; gl. I deeply 2-tid at the top, lobes linear ciliate divergent, sides with a row of large tubercles each carrying a pencil of long hairs; II membranous, linear-lanceolate, acuminate, 1-nerved; III shorter, oblong, acute, nerveless, glabrous, epaleate; IV much shorter, oblong, obtuse, 1-nerved or nerveless. Pedicelled spikel-ts \(\frac{1}{2}\) in., narrowed almost from the base into a long subulate ciliate blade; II cymbiform, glabrous, narrowed into a scabrid awn; III and IV 0, pedicel with one margin shortly ciliate.

2. B. hirsutus, Munro ex Benth. in Journ. Linn. Soc. xix. (1881) 68; perennial, spikes peduncled naked, gl. I of sessile spikelet narrowed into a long narrow flat 2-fid beak margins villous, gl. III and IV paleate. Boiss. Fl. Orient. v. 466; Duthie Grass. N. W. Ind. 17, Fodd. Grass. N. Ind. 28, t. 17. Rottboellia hirsuta, Vahl Symb. i. 11; Del. Fl. Ægypt. t. 14, f. 1; Kunth Enum. Pl. i. 467; Hack. Monogr. Androp. 311. Ischæmum hirsutum, Nees ex Steud. Syn. Gram. 361. 1. mastwatum, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1833), 298. Coelorachis hirsuta, Brongn. in Duperr. Voy. Bot. 68. Lasiurus hirsutus, Boiss. Diagn. Pl. Or. II. iv. (1859) 146. Saccharum hirsutum, Forsk. Fl. Ægypt. Arab. 16.

NORTHERN PANJAB; Jelalpoor on the Jhelum, Jacquemont; Peshawur, alt. 3500 ft., Stewart. RAJPOOTANA; Multan, Edgeworth; Sind, Stocks.—DISTRIB. Westward to N. Africa.

Rootstock woody, branched. Stems 1-2\frac{1}{2} ft., ascending from a branching base, stout, smooth, rigid. Leaves narrow, coriaceous, sheaths white. Peduncle 6-10 in., slender. Spike solitary, stout, 2-4 in., silvery silky all over. Spikelets imbricating, appressed to the rachis; gl. I of lateral spikelet divergent, narrowly lanceolate, coriaceous, 7-9-nerved; II \frac{1}{2} shorter, chartaceous, 5-nerved, aristately acuminate, awn scabrid; III hysline, oblong, obtuse, faintly nerved, neuter, palea lanceolate, nerves scaberulous; IV oblong, obtuse, faintly 5-nerved, palea as of gl. III but smaller. Pedicelled spikelet smaller, erect; gls. shorter, flowerless.—Regarded by Hackell as an anomalous Rottboellia, and nearer to Ischæmum than to Elionurus, but neither in habit nor characters does it approach the Rottboelliae; and is naturally, I think, an Elionurus, from other species of which it only differs in the paleate gls. III and IV.

51. CLEISTACHNE, Benth.

Tall perennial grasses. Leaves long, narrow, flat. Spikelets solitary, 1-fld., in an oblong contracted much branched panicle, linear-oblong, terete, hirsute, jointed on the branchlets of the panicle. Glumes 4, I and II narrow, rigidly coriaceous, obtuse, completely enveloping. III and IV; III much smaller, narrow, hyaline, 2-nerved, margins inflexed ciliate; IV very short, hyaline, with a terminal stout twisted awn; palea minute, hyaline, ciliate. Lodicules cuneate, ciliate. Anthers 3, large, linear. Styles free, stigmas short. Grain obovate-oblong, compressed, free.—Species 3, the following and 2 African.

The affinities of this genus and of Germainia are with Anthistiria.

C. Stocksii, Hook f.; ligule oblong, spikelets dark brown, margins of gl. IV entire, palea ovate obtuse.

MALABAR; on the Bababoodan Hills, Stocks, Ritchie.

Stem tall, stout, simple. Leaves 12-.6 by \(\frac{1}{2} \) in., finely acuminate, softly hairy, midrib stout, margins slightly thickened ciliolate; sheath terete; ligule coriaceous. Panicle 6-8 in., long-peduncled, suberect; rachis and branches sparsely ciliate, branchlets (pedicels of spikelets) strigose with bright yellow hairs. Spikelets \(\frac{1}{2} \) in., crowded; callus short, bearded; gl. I dark brown, obscurely many-nerved, hirsute, shining; II like I but narrower, nearly glabrous; III 2-nerved, margins infolded, tip hispid; IV a twisted awn \(\frac{3}{2} - 1 \) in. long, dilated at the baso into a hyaline 3-nerved membrane embracing the minute palea.—Very closely allied to the African C. sorghoides, Benth., which differs in its very short ligule, golden yellow spikelets, usually 2-fid gl. IV, and transversely oblong ciliate palea.

52. GERMAINIA, Balans. & Poitrass.

Rigid perennial grasses. Leaves narrow. Peduncles erect, bearing terminal narrowly oblong naked heads of 4 male spikelets, forming an involucriform whorl round a few long-awned females. Male apikelets sessile, 2-fld., glumes 4; I linear-oblong, very coriaceous, truncate, many-nerved, dorsally convex; II rather longer but much narrower, membranous, narrowly lanceolate, 3-nerved; III hyaline, narrowly lanceolate, 1-nerved, diandrous; its palea (if present) as long as itself; IV hyaline, lanceolate, diandrous; palea as long. Fem. spikelets much smaller than the male, cylindric, obliquely inserted on a pedicel by an obconical bearded callus; glumes 3, I chartaceous, linear, truncate, convolute round the others; II similar, but shorter; III the long twisted awn which is slightly dilated at the very base; palea short, very broad, tip erose. Lodicules 0. Anthers 2, very long. Styles slender, stigmas long narrow. Grain closely wrapped in the glumes.—Species 3 or 4, Indian, African and Chinese.

1. G. khasiana, Hack. in Estr. Bot. Zeitschr. xli. (1991) 50; leaves short linear-lanceolate quite glabrous, male spikelets sessile on the contracted tip of the peduncle, gl. I entire retuse or notched.

KHASIA HILLS; at Nurtiung and Poorung, alt. 4-4500 ft., Clarke.

Stems densely tufted, a foot high, erect, leafy, terminating in long slender peduncles. Leaves 1-2 in., narrow, acuminate, coriaceous, 1-nerved; ligule hardly any. Heads \(\frac{1}{2} - \frac{3}{2} \) in. long. Gl. I of male fl. polished, tip ciliolate; gl. I of bisexual spikelet scaberulous, tip ciliolate; awn of III 2 in. long.—Very near G. capitata, Bal. & Poitr. of China, and probably only a form of that plant, which has rather larger heads and its gl. I has a semicircular retuse tip with a sharp tooth on each side.

2. **G. lanipes,** Hook. f.; leaves very long and narrowly linear sheaths at the base of the stem clothed with silvery wool, male spikelets superposed on a very short rachis.

TENASSERIM, Helfer.

I have examined very scanty material of this curious species, which differs from G. khasiana in the short stout rootstock with very thick roots, clothed for an inch or more with snowy wool, and radical leaves a ft. long by k in. broad.

52.1 COELARTHRON, Hook. f.

(Genus not in Clavis, p. 5.)

A very slender, straggling, nearly glabrous grass. Leaves small, elliptic, acute at both ends. Spikelets 1-fld., binate, a sessile bisexual and a minute often imperfect pedicelled, secund and imbricating on the fragile rachis of

a solitary erect spike; lowest pair on the spike imperfect; joints of rachis shorter than the sessile spikelet, clavate, tubular, tip truncate open, mouth entire compressed. Sessile spikelets dorsally flattened; callus very short, bearded; gl. I ovate-oblong, tip narrowly truncate, dorsally glabrous with a deep median channel, margins narrowly inflexed above broadly incurved below, keels subpectinately ciliate above the middle; II cymbiform, 1-nerved, awned; III oblong, 1-nerved; IV very small, 2-fid, 3-nerved, awn slender, twisted; palea minute. Lodicules 2, cuneatequadrate. Stamens 3. Styles 2. Grain fusiform. Pedicelled spikelets = \frac{1}{2}\$ the sessile or less, male or neuter gls. 2-3, not awned; pedicel linear, flat.

A remarkable grass, differing from Andropogon in the secund spikelets, hollow joints of the rachis, deeply channelled gl. I of the sessile spikelet (as in Sect. Selvina of Ischæmum), and the reduced pedicelled spikelets.

C. Brandisti, Hook. f. in Hook. Ic. Plant. ined.

BURMA; high ground, generally with Teak, Brandis.

Stems very weak, branching, struggling, rooting at the nodes, white; with ascending filiform 1-2-leaved flowering branches. Leaves 1-2 by \(\frac{1}{2}\)-\(\frac{1}{4}\) in., inserted on the sheath by a mere point; acute or acuminate at both ends, membranous, flaccid, surfaces and margins quite smooth, midrib and nerves very slender; sheath glabrous; ligule oblong, obtuse. Spike 1-1\(\frac{1}{4}\) in., strict or incurved, quite white. Sessile spikelets \(\frac{1}{4}\) in.; gl. I with a strong median keel on the ventral surface; II notched at the tip, awn as long as the gl. or shorter, very slender, recurved; III flat, ciliate; awn of IV \(\frac{1}{4}\) in., very slender, geniculate, column brown twisted, upper half very pale.

53. ANDROPOGON, Linn.

Grasses of various habit. Leaves usually narrow, base rarely rounded or cordate. Inflorescence of solitary binate digitate fascicled or panicled spikes (which are sometimes reduced to 3 spikelets), rachis articulate, usually fragile. Spikelets binate, a sessile fem or bisexual, and a pedicelled male or neuter. Sessile spikelet 1-fid., glumes 4, I dorsally rarely laterally more or less compressed, margins inflexed or incurved, usually keeled; II as long as I, usually laterally compressed, awned or not; III hyaline, empty, 2-nerved or nerveless, epaleate; IV hyaline, broad or narrow, 2-fid and awned in the cleft or reduced to an awn more or less dilated at the base, paleate or not. Lodicules cuneate-quadrate. Stamens 3. Stigmas laterally exserted. Grain free. Pedicelled spikelets various, gls. 3-4, IV awnless.—Species about 200, chiefly tropical.

In this most difficult genus I have followed Hackel as closely as I could, not venturing to depart far from his grouping of the Indian species, to attempt which with any prospect of success would demand a revision of the whole genus. Hackel's two principal groups (Series), Isosygi and Heterosygi, unfortunately separate widely subgenera of close affinity in habit and in all other characters, except that adopted to distinguish between these groups. Thus the first two or even 4 subgenera of Isosygi are closely related to Cymbopogon amongst Heterosygi, and not to those that immediately follow them in the series. Added to this, on the one hand the characters drawn from the form, sexuality, &c., of the lower sessile spikelets of the Heterosygi as distinguishing them from those of Isosygi are often variable and very difficult of detection; and on the other hand the same characters do occur here and there in several subgenera of the latter group. With regard to Hackel's subgenera, they appear to me to be on the whole well constructed and natural, though often depending on characters, some inconstant, others difficult of detection or appreciation. Of the best defined I should, following older authors, have preferred to have treated

them as genera, especially Chrysopogon, Cymbopogon and Heteropogon: and his section Pseudanthistiria of subgen. Hypoginium, should certainly rank as a genus closely allied to Anthistiria. - The following is Hackel's grouping :-

Series I. Isozygi. Sessile spikelets of all the pairs alike in sex and form

throughout the spikes.

* Peduncle of spikes enclosed in spathiform leaf-sheaths.

+ Joints of rachis and pedicels of upper spikelets clavate or trumpet-shaped, top cupular with toothed margins.

& Spikes solitary on the peduncle.

Pedicelled spikelets smaller than the sessile 1. SCHIZACRYBIUM. Peduncled spikelets larger than the sessile . 2. DIECTOMIR. §§ Spikes 2 or more on the peduncle . 3. ARTHROLOPHIS. †† Joints of rachis and pedicels of upper spikelets slender.

top obliquely truncate cupped or not .

Peduncles of spikes not enclosed in spathiform leafsheaths; joints of rachis slender.

Joints of rachis and pedicels of upper spikelets linear compressed with usually a central translucent channel and thickened margins

Joints of rachis very few, filiform, opaque; lodicules ciliate; grain dorsally compressed .

Joints of rachis many, stout or slender, opaque . Joints of rachis few; spikes articulate on the obliquely

truncate bearded tips of the branches of the panicle 8. CHRYSOPOGON. Series B. HETEROZYGI. Lowest one or more sessile spikelets differing from all

those above it in sex or form. Spikes many (rarely 1 or few) on the peduncle digitate, sessile spikelets dorsally compressed

Spikes binate on the peduncle which is enclosed in a spathiform sheath; sessile spikelet dorsally compressed . Spikes solitary, lower pairs of spikelets very unlike the

upper; upper sessile spikelets cylindric

9. DICHANTHIUM.

CYMBOPOGON.

4. HYPOGYNIUM.

5. AMPRILOPHIS.

6. Sorghum.

7. VETIVERIA.

11. HETEROPOGON.

Subgen. I. Schizachyrium, Benth. Spikes solitary; peduncle in a spathiform leaf-sheath; joints and pedicels clavate or bucciniform, mouths broad cupular irregularly toothed. Sessile spikelets dorsally compressed, callus short; gl. I keeled; II not awned; IV hyaline, 2-fid, awned in the cleft. Pedicelled spikelets usually small, imperfect and withering.

* Annuals.

1. A. brevifolius, Sw. Prodr. Veg. Ind. Occ. 26, Fl. Ind. Occ. i. 209; glabrous, stems slender straggling much branched leafy. leaves divaricate linear obtuse or subacute, spathes very narrowly linear spreading, spikes glabrous or sparsely hairy. Kunth Revis. Gram. ii. 563, t. 196, Enum. Pl. i. 488, Suppl. 399; Steud. Syn. Gram. 366; Hack. Monogr. Androp. 363; & in Mart. Fl. Bras. ii. III. 302; Benth. Fl. Hongk. 423; Duthie Grass. N.W. Ind. 19, Fodd. Grass. N. Ind. 34; Griseb. Fl. Brit. W. Ind. 538. A. debilis, Kunth l.c. A. flaccidus, A. Rich. Tent. Fl. Abyss. ii, 452. A. floridus, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1833) 265. A. fragilis, Br. Prodr. 202; Kunth Enum. l.c. A. obtusifolius. Poir. Encycl. Suppl. i. 583. A. parviflorus, Roxb. Fl. Ind. i. 274. A. tenellus, Presl Rel. Hænk. i. 335. Pollinia fragilis & brevifolia, Spreng, Syst. i. 288, 289. P. vaginata, Spreng. Pugill. ii. 11. Schizachyrium, brevifolium, Ness Agrost. Bras. 332.—Andropogon, Wall. Cat. n. 8824-5-6. Batratherum. Wall. l.c. n. 8827.

TROPICAL HIMALAYA, from Kumson to Sikkim, BEHAR, CENTRAL INDIA,

CHITTAGONG, BURMA, the NICOBAR ISLDS., and the MALAY PENINSULA.—DISTRIB.

Tropics.

Stems 8-24 in., very many from the root, filiform, flaccid, geniculate, leafy throughout. Leaves 1-3 in., 1-1 in. broad, flat, glabrous, margins and nerves beneath scabrid. Spikes numerous; peduncle capillary; spathes 1-1; in., flut; joints 5-10 as long as the sessile spikelet, and pedicels clavate, tips 2-toothed. Sessile spikelets & in., linear-oblong; gl. I coriaceous, tip 2-fid; awn \(\frac{1}{2}\)-\(\frac{1}{2}\) in. Pedicelled spikelet reduced to a long-awned glume.

2. A. axilis, Hochst. in Flora, xxvii. (1844) 241; slender, erect, fastigiately branched above, leaves very narrow acuminate, spathe erect nurrowly lanceolate, spikes silkily villous. Hack. Monogr. Androp. 365. A. fragillimus, Steud. Syn., Gram. 384. A. fragilissimus, Hochst. in Schimp. Pl. Abyss. n. 2057. A. Petitianus, A. Rich. Tent. Fl. Abyss. ii.

BENGAL, Chota Nagpore, and the Central Provinces, Clarke, Duthie, &c .-

DISTRIB. Afric. trop.

Stems short stout and densely tufted, or lax erect and 12-18 in. high, leafy. Leaves 1-3 in., erect, glabrous or sparsely hairy. Spathes 1-1½ in., slender; peduncles ‡-1 in., compressed. Spikes very slender; joints 8-12, about ½ in. long, silkily ciliate, and pedicels thickened upwards, tips lunate. Sessile spikelets as long as the joints, subulate lanceolate; gl. I coriaceous, dorsally silkily villous, tip very slender bifid; II linear-lanceolate, 1-nerved, tip with a short bristle; IV bifid; awn 1-4 in., very slender. Pedicelled spikelet subulate, silky; gl. I shortly awned, whole plant reddish when dry.

** Perennials.

3. A. impressus. Hack. in Estr. Bot. Zeit. xli. (1891) 49; very slender, sparingly branched, leaves very narrow, joints of spikes 3-5 and pedicels very stout densely ciliate, gl. I of sessile spikelets glabrous lanceolate acuminate, deeply impressed between the scaberulous keels.

N.W. HIMALAYA; Kishtwar, Clarke, alt. 4000 ft.

Perennial. Stems erect; flowering branches distant. Leaves 4-8 in., setaceously acuminate; sheath short, smooth; ligule rounded. Spathes slender. Spike about 1 in., scarcely exserted; peduncle glabrous; joints and pedicels subclavate, shorter than the sessile spikelets, densely ciliate, tops obliquely cupped. Sessile spikelets in., liuear-lanceolate, greenish, callus nearly glabrous; gl. I chartaceous, glabrous, tip 2-toothed, margins rather broadly inflexed; II lanceolate, acute, keeled, 8-nerved scabrid above; III oblong, obtuse, nerveless, ciliolate; IV oblong, cleft to below the middle, lobes glabrous; awn 1-1 in., very slender, pale. Pedicelled spikelets very narrow, gl. I linear-lanceolate, acuminate, purplish, 9-11-nerved; II 3-nerved, acute; III 2-nerved, obtuse; IV 0.—Near A. Alopseurus, Hack. (of the Mauritius), which differs in the many-jointed spikes, in the 6-7-nerved gl. I which is more deeply channelled in the middle. The habit is that of a Cymbopogon.

4. A. bootanensis, Hook. f.; tall, stout, leaves very long, joints of spike few and pedicels long-ciliate, gl. I of sessile spikelets glabrous linear-oblong truncate dorsally convex keels obscurely winged above.

BHOTAN HIMALAYA; Tassangsee, alt. 5-6000 ft., Griffith.

Perennial. Leaves 2-3 ft. narrowly linear, coriaceous, and sheaths smooth and glabrous. Spike 1-2 in., peduncle subexserted from the very narrow spathe; joints and peduncles half as long as the sessile spikelet, rather slender, tips toothed. Spikelets red-brown, } in.; callus bearded; gl. I nerves obscure; II coriaceous, acute, 1-nerved; III linear-oblong, ciliate, nerveless; IV short, lobes ciliate; awn very slender short; pales minute, ovate. Pedicelled spikelet like the sessile .- I have seen but one specimen, it is allied to A. impressus, but is a much stouter plant, 3-4 ft. high.

5. A. hirtiflorus, Kunth Revis. Gram. ii. 569, t. 198, Enum. Pl. i. 489; erect, stiff, leaves linear rigid, spathes long-peduncled, spike 2-5 in. glabrous or nearly so, sessile spikelets \(\frac{1}{2}\)-\frac{1}{2} in. narrowly lanceolate. A. Pseudograyia, Steud. Syn. Gram. 365; Hack. Monogr. Androp. 370. A. zeylanicus, Arn. ex Benth. Fl. Hongk. 423; Thw. Enum. Pl. Zeyl. 368; Trim. Cat. Ceyl. Pl. 107. A. semiberbis, Kunth Enum. l. c. Rottboellia sanguinea, Retz. Obs. iii. 25. Pollinia fulta, Desv. Opusc. 69; Hack. l. c. 392. Thelepogon sanguineus, Spreng. Syst. i. 299. Schizachyrium zeylanicum, Arn. l. c. S. hirtiflorum and semiberbe, Nees. Fl. Afr. Austr. 334, 336.

KHASIA HILLS, alt. 4-5000 ft., J. D. H. & T. T., Clarks. BURMA, Kurs. CENTEAL PROVINCES, alt. 3-4000 ft. CEYLON.—DISTRIB. Tonkin, China, Mada-

gascar, Trop. and S. Africa and America.

Perennial. Stems tufted, 1-4 ft., simple or sparingly branched upwards, as thick as a crow-quill or less, smooth, shining. Leaves chiefly radical, 2-6 in. by \$\frac{1}{2}\dagger_0^2\$ in., obtuse acute or accuminate; shoath compressed. Spathes 1-2 in., linear-lanceolate, acuminate. Spike stout, very narrow, subterete; rachis stout, shining, joints shorter than the sessile spikelets, outer or both margins ciliolate, tip hollowed strongly toothed. Sessile spikelets \(\frac{1}{2}\) in., very narrow, half sunk in the concave faces of the joints; gl. I narrowly lanceolate, bicuspidate, dorsally rounded, faintly 5-nerved; II lanceolate, acuminate, with a gibbous base, and a narrow ciliate dorsal wing above the middle; III linear-oblong, acute, fimbriate; IV lobes narrow, acuminate, awn about \(\frac{1}{2}\) in. Pedicalled spikelets, gl. I flat, subulate, awned, margins inflexed; II short, oblong.—Dr. Stapf has identified the Indian A. Pseudograyia with its American and African species cited above, of which I have not given all the synonyms, which will be found in Hackel's Monograph.

Subgen. II. Directomis, Hack. Spikes solitary; peduncle in the axil of a spathiform leaf-sheath, joints and pedicels bucciniform, mouths toothed. Sessile spikelets laterally compressed, callus short; gl. I accumbent, keeled, II much broader long-awned; IV 2-toothed, awned in the sinus. Pedicelled spikelet twice as long and broad as the sessile and concealing it.

6. A. fastigiatus, Sw. Prodr. Veg. Ind. Occ. 26, Fl. Ind. Occ. i. 207; Hack. Monogr. Androp. 393; Griseb. Fl. Brit. W. Ind. 559. A. diatherus, Hochst. in Schimp. Pl. Abyss. n. 2013 (non Steud.), A. Hochstetteri, Steud. Syn. Gram. 384. Diectomis fastigiatu, H. B. & K. Nov. Gen. & Sp. i. t. 64 (excl. Syn. Beauv.); Kunth in Mem. Mus. Par. ii (1815) 69; Nees Agrost. Bras. 340 (non Beauv.); Hack. in Mart. Fl. Bras. ii. II. 303. Pollinia fastigiata, Spreng. Pugill. ii. 13. Heteropogon Hochstetteri, Anderss, in Schweinf. Beitr. Fl. Æthiop. 310.

BERAR; near Gya and Chota Nagpore, Clarke, Duthie. TENASSERIM, Helfer.

-DISTRIB. Tonkin, China, Afr. and Amer. trop.

Perennial. Stem erect 6 in. to 3 ft., or decumbent below and fastigiately branched upwards, leafy. Leaves 3-12 in., narrowly linear, acuminate, scabrid; liqule elongate, acute. Spathes 2-3 in., linear-lanceolate, often very slender; peduncle variable, tip cupular. Spikes solitary, 1-2 in., fragile, joints much shorter than the spikelets, villous with white hairs, tip broad strongly toothed. Sessile spikelet ½-½ in., oblong; callus hairs = ½ the spikelets; gl. I linear-lanceolate, bicuspidate and keeled, margins thickened, ciliate towards the top; II shorter, cymbiform, 2-fid, awned between the short obtuse lobes, dorsally keeled and ciliate above, awn much longer than the spikelets; III linear-oblong, margins ciliate; IV cymbiform, 2-toothed, with a stout dorsal awn from below the tip; palea minute, hyaline. Pedicelled

spikelets neuter; gl. I ovate-lanceolate, twisted, acuminate, 2 cuspidate and awned, ciliate, green, many-nerved; II much smaller, thin, acuminate, awned, III still smaller, obloug, hyaline.—I have examined spikelets of the type of Homæatherum chinense, Nees in Hook. & Arn. Bot. Beech. Voy. 239, which is certainly not Androp. apricus, as supposed by Hackel, but very close to A. fustigiatus, if not the same.

Subgen. III. HYPOGYNIUM, Hack. Spikes solitary, peduncled in the axil of a spathiform leaf-sheath; joints and pedicels slender, tops obliquely truncate. Sessile spikelets dorsally compressed; gl. I with inflexed or involute keeled margins; II kelled, awnless; III hyaline or 0; IV a simple awn (in the Indian species). Pedicelled spikelets like the sessile.

Huckel's section Pseudanthistiria forms one of the most distinct genera of Andropogonea, with characters of inflorescence and spikelets totally at variance with his characters of Hypogynium. He however observes its affinity with Anthistiria, near to which genus I place it.

7. A. foveolatus, Del. Fl. Egypt. 16a, t. 8, f. 2; densely tufted, basal sheaths silkily villous, spikes 3-6 elongate erect. gl. I of sessile spikelet smooth with usually a deep dorsal pit. Kunth Enum. Pl. i. 490; Hack. Monogr. Androp. 402; Duthie Grass. N.W. Ind. 20, Fodd. Grass. N. Ind. 34, t. 21; Aitchis. Cat. Panjab. Pl. 176. A. strictus, Roxb. Fl. Ind. i. 260. A. Orthos, Schult. Mant. ii. 455. A. monostachyus, Spreng. Pugill. ii. 9. A. ramosus, Heyne ex Wall. Cat. n. 8802.—Andropogon, Wall. Cat. 8802.

Drier parts of India, from the Panjab and Sind to Bengal, Chota Nagrobe, Central Provinces, Circaes and Coromandel.—Distrib. Westwards to the

Cape de Verd Islds.

Stem 1-2 ft., simple or subfastigistely branched above, as thick as a sparrow's quili; nodes sparingly bearded. Leaves very nerrow, sometimes almost filiform, rigid, scaberulous beneath, sheaths shorter than the internodes, scabrous or glabrous; ligule short, truncate, hyaline, ciliolate. Spikes 1-1½ in.; peduncles capillary, erect, usually far exserted beyond the very slender spathe; joints and pedicels slender, villous. Sessile and pedicelled spikelets subequal ½-½ in., linear-oblong, subsoute, purplish, glabrous except the shortly villous callus, shining; gl. I flat, 4-7-nerved, keels scabrid; II as long, 3-nerved, acute; III much shorter, glubrous, nerveless; IV awn ½-½ in. long, very faintly margined towards the base. Pedicelled spikelet rufous or purplish, neuter; gls. 2, I subscute, dorsally pitted or not, keels scabrid, 5-nerved, glabrous; II linear-lanceolate, acute, 3-nerved.

8. A. tuberculatus, Hack. Monogr. Androp. 404; tall, stout, basal sheaths glabrous, spikes solitary long-peduncied erect, gl. I of sessile spikelet lanceolate keels and nerves tubercled not pitted.

CENTRAL PROVINCES; in the Khandua and Betul districts, Duthie; Asinagarh, Kuntze.

Stem 4-6 ft., stout, stiff, pale yellow, shining, paniculately branched, nodes glabrous. Leaves 1-2 it. by \(\frac{1}{2} \) in., rather rigid, glaucous, strongly closely nerved, setaceously acuminate, base narrowed, scabrid, midrib very broad; sheath quite smooth; ligule large, membranous, auricled. Spikes 1-1\(\frac{1}{2} \) in. Panicle leafy; spathes very narrow, scabrid with tubercle-based hairs; peduncle 2-4 in., strict, scabrid; joints and pedicels very slender, ciliate with long hairs. Sessile spikelets \(\frac{1}{2} \) in., linear-lanceolate, callus shortly bearded; gl. I lanceolate, tip narrowly truncate, dorsally flat, 3-7-nerved, margins narrowly inflexed, keels and nerves tuberculate; II membranous, lanceolate, acute, 1-nerved, ciliate; III linear, acute,

glabrous; IV awn ½-% in. Pedicelled spikelets male, gl. I strongly nerved; IV 0.—A very handsome grass.

Subgen. IV. ARTHROLOPHIS. Spikes 2-nate digitate or subpaniculate, on a common peduncle arising from a spathiform sheath; joints few or many, clavate or bucciniform (slender in A. tristis), tips cupular with toothed margins. Sessile spikelets dorsally compressed; gl. I not awned, margins inflexed, keeled; 11 dorsally keeled, awned or not; III hyaline; IV small, 2-fid with an interposed awn, or reduced to a simple awn. Pedicelled spikelets usually unlike the sessile; gl. I awned or not.—A heterogeneous assemblage.

- * Joints of spikes and pedicels of upper spikelets rather slender; gl. II of sessile spikelet not awned.
- 9. A. tristis, Nees ex Hack. Monogr. Androp. 439; spikes 3-6 und unequal stipitate or subsessile on the peduncle, gl. I of sessile spikelet lanceolate deeply depressed between the thickened sides, IV very narrow 2-fid.

TEMPERATE WESTERN HIMALAYA, alt. 8-1000 ft., from Kashmir to Garwhal. Stems 2-3 ft., compressed, tufted on a stout short or creeping rootstock, slonder or rather stout, erect or geniculate below, branching above; nodes glabrous. Leaves 6-10 by \(\frac{1}{2}\)-\frac{1}{2}\] in., narrowly linear, scaberulous, rather rigid, hairy at the base; lower sheaths broad, compressed; ligule oblong, membranous. Spikes 1-3 in., livid green; peduncle 2-6 in., spathe very narrow; joints and pedicels = \(\frac{1}{2}\) the sessile spikelet, hardly clavate, shortly ciliate. Spikelets loosely imbricate, sessile \(\frac{1}{2}\) in., very narrow; callus hairs very short; gl. I more or less scaberulous margins broadly inflexed; II narrowly oblong, apiculate, ciliate, keel subscaberulous; III lanceolate, 2-nerved, ciliate; IV awn short or 0; palea minute, quadrate. Pedicelled spikelets as long as the sessile, gl. I 3-7-nerved; III -5-nerved; III hyaline; IV 2-fid and mucronate or 0, paleate or not.

- ** Joints of spikes and pedicels of upper spikelets clavate or bucciniform.
 - † Gl. II of sessile spikelets awned.
- 10. A. apricus, Trin. in Mem. Acad. Petersb Ser. VI. iv. (1836) 83; tall, slender, leaves very narrow, spikes 2-5 hispidulous, joints and pedicels bucciniform, gl. I of sessile spikelets linear 2-cuspidate or 2-aristulate, II long-awned, IV bifid awned between the ciliate lobes. Hack in Mart. Fl. Bras. ii. II 304. A. apricus var. indicus, Hack. Monogr. Androp. 457. A. ascinodis, Clarke in Journ. Linn. Soc. xxv. (1889) 87, t. 36.

KHASIA HILLS, alt. 2-3500 ft., J. D. H. & T. T. (Herb. Ind. Or. Androp. n. 4).
MUNNEPORE; on Juckpho, alt. 7500 ft., Clarke. PEGU; in the Eng forest, Kurz.—
DISTRIB. Trop. Africa and America.

Stem 3-5 ft., strict, sparingly branched upwards, quite smooth, nodes glabrous. Leaves 1-3 ft. by \(\frac{1}{2}\) in., erect, coriaceous, glabrous except a few hairs at the base; sheaths very long, narrow, upper spathiform, very slender, tips setaceous, lower open; ligule oblong, obtuse, chartaceous. Inflorescence subpanieled; peduncle 2-4 in., filiform, puberulous, sheathed almost up to the spikes. Spikes \(\frac{1}{2}\)-1 in., very unequal in each fascicle, very shortly stipitate, hairs or cilia rigid setiform brownish, joints and pedicels half as long and as broad as the sessile spikelets, cuneately campanulate, base narrow, dorsally rounded, glabrous or scaberulous, sides ciliate with long hairs. Sessile spikelets \(\frac{1}{2}\)-\frac{1}{2}\) in.; callus conical, rigidly bearded; gl. I deeply channelled dorsally, keels scabrid above the middle, thickened below, nerves 2-nate at the keels; II 1-nerved, margins ciliate, keel setulose at the top, tip 2-fid, awn as long as itself; III linear, hyaline, broadly ciliate; IV shorter, oblong, 1-nerved;

awn 1 in. slender; palea small, linear-oblong, ciliate. Pedicelled spikelets narrower and rather smaller than the sessile, purplish; gl. I ovate-lanceolate, 2-cuspidate, keels long ciliate above the middle; II and III as in the sessile spikelet.—According to Hackel the Indian plant differs from the African in the longer hairs of the joints and pedicels and in the more exserted peduncle of the spikes, but I find that these and other minute characters are very inconstant. Homocatherum chinense, Nees, included under A. apricus, is, I think, certainly A. fastigiatus.

11. A. longipes, Hack. in Flora (1885) 138; annual, stem slender ascending, leaves linear and sheaths sparsely hirsute, spikes 2 both stipitate, peduncle naked (spathe 0), joints many and pedicels rather stout subclavate tips cupped shortly ciliate, sessile spikelets $\frac{1}{3}$ in. dorsally compressed oblong-lanceolate, gl. I broadly unequally winged above the middle aristulate, II long-awned, IV obovate cleft to the middle, awned between the lobes.

NILGHIRI HILLS, Perrottet.

Stems 12-16 in, decumbent below, nodes glabrous. Leaves 4-6 by $\frac{1}{8-5}$ in, hairs tubercle-based; ligule very short. Spikes 2-3 in., rather stout, dense-fld., green; joints and pedicels = $\frac{1}{8}$ the sessile spikelet, concavo-convex, margins rounded. Spikelets imbricating, callus short, obtuse, bearded; gl. I dorsally sparsely hairy and depressed or convex, many-nerved, wing produced beyond the summit serrulate; II ciliate, 3-nerved, lateral nerves submarginal, tip 2-toothed, keel scaberulous, awn as long as the gl.; III hyaline, 2-nerved, copiously ciliate; IV as long as III; lobes lanceolate, acuminate; awn $\frac{3}{8}$ in, glabrous. Pedicelled spikelets as long as the sessile, male; gl. I shortly awned, 6-7-nerved; II membranous, 3-nerved; III and IV linear-oblong, ciliate.—I have seen only one specimen. This, I think, is a doubtful member of the subgenus, the peduncle not arising from a distinct fluttened spathe.

++ Glume II of sessile spikelets not awned.

12. A. pumilus, Roxb. Fl. Ind. i. 273; stem paniculately branched, leaves narrow, spikes in pairs, joints and pedicels clavate or trumpet-shaped, sensile spikelets dorsally compressed, gl. I very narrow lanceolate deeply channelled between the thickened keels, IV very narrow bisetose. Kuuth Enum. Pl. i. 492; Steud. Syn. Gram. 388. A. demissus, Steud. l. c. A. geminatus, Herb. Russ. ex Wall. Cut. n. 8798 C. A. humilis, Wight Cat. n. 1701. A. caesius a, Nees ex Wight l. c. n. 1700. A. hirtus, Heyne in Herb. Roth. A. pachyarthrus, Hack. Monogr. Androp. 449; Duthie Grass. N.W. Ind. 21, Fodd. Grass. N. Ind. t. 39.—Andropogon, Wall. Cat. n. 8798, A. B. C., 8799.

Drier parts of India. Nepal, Wallich, &c.; from Banda in Rajpootana, and Surat to the Central Provinces and Coromandel.

Annual or perennial? Stem 6-18 in. high, slender, subcrect or geniculate and decumbent below; nodes glabrous. Leaves 3-5 in., rarely \(\frac{1}{6} \) in. broad, sometimes almost filiform, acuminate, glabrous; sheath compressed, k\(\frac{1}{6} \) edel; ligule short, truncate. Spikes \(\frac{1}{6} \) \(\frac{1}{6} \) in., in pairs terminating a very slender peduncle which arises from a narrow flattened glabrous spathe \(\frac{1}{6} \) in. long; joints 6-8 and pedicels shortly ciliate on one margin, tops dilated cupped with 2-3 toothed margins. Sessile spikelets \(\frac{1}{6} \) in.; callus glabrous; gl. I membranous, acuminate, bicuspidate, lateral ribs often ending below in 2 tubercles; II as long, narrowly lanceolate, mucrouate, coriaceous; III shorter, linear, hyaline, 2-nerved; 1V very narrow, cleft into two capillary-lobes with an interposed capillary awn \(\frac{1}{6} \) in. long; palea minute, oblong. Pedicelled spikelets \(\frac{1}{6} \) \(\frac{1}{6} \) in., ovate-lanceolate, acuminate, 5-nerved; gls. 3.

—An excellent figure amongst Roxburgh's drawings attests Hackel's A. pachy-arthrus being A. pumilus. The peduncle of the spike is sometimes 2 in. long. Wallich's n. 8799 is very tall and slender, as if drawn up amongst other plants.

13. A. Munroi, Clarke in Journ. Linn. Soc. xxv. (1889) 87, t. 37 (char. reform.); tall, slender, leaves very narrow, spikes in a small open subsimple panicle terminating solitary capillary sheathed peduceles, joints and pedicels clavate shortly silkily ciliate, sessile spikelets lanceolate, gl. I acuminate deeply hollowed between the thickened keels, IV very narrow bisetose.

NORTH MUNNEPORE, alt. 3500 ft., Clarke.

Stem 2-3 ft., sparingly branched upwards, slightly compressed, nodes glabrous. Leaves 6-10 by 10 in., rather coriaceous, smooth, glabrous, nerves close-set, glaucous beneath with prominent midrib; sheath terete, smooth keeled; ligule rather long. Spathe 1-21 in., very slender, terete, acuminate. Panicle 1-11 in., as broad as long, of few irregular spreading branches. Spikes 4-8, 1-1 in. long, very shortly stipitate, solitury or 2-8-nate, divaricate or drooping, peduncle and pedicels of spikes smooth, glabrous; joints and pedicels of upper spikelets with irregularly toothed cupular tips; lowest pair of spikelets sometimes imperfect or male. Spikelets 4-6 pairs, h in. long, laxly imbricating; sessile, callus shortly softly bearded; gl. I coriaceous, glabrous, shining, margins incurved, keels minutely scaberulous, nerves 0, or one vanishing below the middle; II acuminate, 3-nerved, keel ciliolate above the middle; III hyaline, ovate-oblong, 2-nerved, glabrous; IV as long as III, lobes subulate, awn 1-3 in., capillary; palea minute, truncate. Pedicelled spikelets male, gl. I linear-oblong, convex, subacute, 7-9-nerved; III acuminate, 3-nerved, glabrous; III as in the sessile spikelets; IV lanceolate.—The figure in Journ. Linn. Soc. gives the habit of the plant, but the description and analysis are very wrong. The former also errs in citing Androp, No. 4, Herb. Ind. or Hf. & T. under A. Munroi, it is A. apricus.

Subgen. V. AMPHILOPHIS, Trin. Spikes 2 or more fascicled or panicled, with many or few joints; joints and pedicels of upper spikelets narrow, linear, flattened, usually channelled and translucent between the thickened sides along the mesial line, terete and opaque in 21. A. concanensis, 27. fascicularis, and 28. venustus, tips simply truncate. Scssile spikelets dorsally compressed; callus short; gl. I acutely 2-keeled; II keeled, awnless; III hyaline, epaleate; IV an awn with the base acute or very rarely dilated and 2-toothed or 2-fid. Pedicelled spikelets usually as long as the sessile, but narrower, many-nerved, and male.

- A. Spikes with many pairs of spikelets.
- * Pedicels of upper spikelets and joints of rachis slender, strongly compressed, with thickened margins and translucent centre.
- † Spikes digitate or fascicled, not panicled, lower longer than the rachis of the inflorescence. (See also 24. A. intermedius.)
- \S Glume I of sessile spikelets more or less villous below the middle. (See also 19. A. pertusus.)
- 14. A. Ischæmum, Linn. Sp. Pl. 1047; leaves narrowly linear, sheaths compressed, spikes 3-20 slender silky rachis glabrous, sessile spikelets \(\frac{1}{8} \frac{1}{6} \) in., callus shortly bearded, gl. I oblong minutely truncate not pitted 5-7-nerved more or less appressedly hairy below the middle, keels rigidly ciliate. Kunth Enum. Pl. i. 499; Host Gram. Austr. ii. 3, t. 3; Reichb. Ic. Fl. Germ. t. 54; News Gen. Fl. Germ. Monocot. i. t. 92; Steud. Syn. Gram. 379; Hack. Monogr. Androp. 474; Aitchis. Cat. Panjab Pl. 176; Duthie Grass. N.W. Ind. 20, Fodd. Grass. N. Ind. 35, t. 23; Benth. Fl. Austral. vii. 531. A. angustifolius, Sibth. & Sm. Prodr. Fl. Græc. i. 47. A. annulatus, F. Schmidt Fl. Cap. Verd. 157. A. radicans,

Lehm. Ind. Sem. Hort. Hamb. 1828; Nees Fl. Afr. Austr. 106. A. villosus, a, Lamk. Fl. Fr. iii. 364.

NORTH WEST INDIA, from Kashmir and West Tibet to Kunawur, ascending to 12,000 ft.—DISTRIB. Westward to S. Europe, and tropics generally or sporadically

Stems 2-3 ft., erect or geniculately ascending, subsimple, naked above; nodes naked or shortly bearded. Leaves 1-2 ft. by \(\frac{1}{16} - \frac{1}{6} \) in., glabrous or hairy above, especially towards the base, glaucous, scaberulous above, base rounded; sheath loose; ligule very short. Spikes unequal, 1\frac{1}{2} - 3 in., shortly stipitate, usually purplish. Sessile spikelets, gl. I dorsally flat; II lanceolate, mucronulate, keels scabrid above; III oblong-lanceolate, acute, ciliate; IV awn \(\frac{1}{2} - \frac{1}{4} \) in. Pedicelled spikelets usually darker than the sessile, male; gl. I lanceolate, 9-nerved, glabrous, keels ciliate above; II linear-lanceolate, 5-7-nerved; III linear-collong, obtuse, ciliate; IV very naridw.

15. A. Pseudischæmum, Nees ex Steud. Syn. Gram. 380; tall, nodes bearded, leaves narrow pruinose beneath, sheaths terete, spikes 4-6 stipitate slender flexuous, rachis smooth, joints and pedicels a little shorter than the spikelets silky, sessile spikelets \(\frac{1}{2}-\frac{1}{2}\) in lanceolate, callus hairs very short, gl. I imperforate sparsely silkily villous below the middle 7-9-nerved, keels ciliate. Hack. Monogr. Androp. 477. A. annulatus & quinqueflorus, Heyne in Herb. Rottl. A. Ischæmum, Roxb. Fl. Ind. i. 264. A. oryzetorum, Hack. l. c. A. pentastachyus & undulatus, Heyne ex Wall. Cat. n. 8815 A. A. scandens, Thw. Enum. Pl. Zeyl. 368 (non Roxb.); Trim. Cat. Ceyl. Pl. 107.

The DECCAN PENINSULA, Heyne, &c. COROMANDEL, Roxburgh. CEYLON, Thwaites.

Stem 2-3 ft., terete glabrous. Leaves 6-10 by \$\frac{1}{8}\$-\$\frac{1}{8}\$ in., glabrous or fimbriate with long hairs towards the base, upper surface and margins scabrid, lower glaucously pruinose, lateral nerves prominent; upper margins of the sheath membranous; ligule very short, ovate, membranous. Spikes flexuous or erect, 2-4 in. long, dull green, subracemose, common rachis smooth, axils bearded, special peduncles \$\frac{1}{2}\$-\$\frac{1}{3}\$ in.; joints and pedicols slender. Sessile spikelets \$\frac{1}{2}\$-\$\frac{1}{3}\$ in.; gl. I minutely truncate, tip hyaline, keels closely ciliolate and with a few long marginal hairs; II ciliate, 3-nerved; III hyaline, oblong, ciliate, 2-nerved or nerveless; IV awn \$\frac{1}{2}\$ in., base obscurely dilated, palea O. Pedicelled spikelets longer than the sessile, lauceolate, gl. I 9-nerved, glabrous dorsally, keels scaberulous and ciliate; II 5-7-nerved; III ovate-oblong; IV minute or 0.—The spikelets vary a good deal in size. The pruinose undersurface of the leaves is a very marked character. Roxburgh's figure of his A. Ischæmum has awns an inch long, but allowance must be made for native artists' work. I have seen only a single specimen of A. oryzetorum, the spikes are very long and flexuous. Hackel distinguishes it from Pseudischæmum by the leaves being scabrous on both surfaces, which they are not in the specimen I have examined.

16. A. compressus, Hook. f.; stem tall robust compressed, nodes glabrous, leaves long broad flat, sheaths compressed keeled, spikes very many densely subcorymbosely panicled pale flexuous silky, joints and pedicels very slender, sessile spikelets in ovate-lanceolate, callus hairs = \frac{1}{2}-\frac{1}{2}\text{ the spikelet, gl. I imperforate 5-7-nerved villous below the middle, keels minutely scabrid.

The DECCAN, Lisboa (No. 6. A. odoratus), Woodrow.

Stem 3-4 ft., as thick as a goose-quill at the base, erect, sparingly branched, leafy. Leaves 1-1½ ft. by ½-½ in., finely acuminate, slightly scaberulous on the margins and both surfaces, a little hairy towards the base; sheaths strongly compressed and acutely keeled, uppermost forming a lanceolate spathe 4-6 in. long to the base of the panicle; ligule a ciliate membrane. Fascicles of spikes 4-5 in. long,

erect, branches slender, lowermost \(\frac{1}{2}\) in. long, and rachis smooth. Spikes 1-2 in. branched at the base, firm, nearly white, callus-hairs \(\frac{1}{3}\) the length of the spikelet. Sessile spikelets, joints and pedicels about = \(\frac{1}{3}\) spikelet, centre hyaline, upper hairs reaching the top of the sessile spikelet; gl. I, thin, margin narrowly incurved, tip truncate, hyaline; II ovate, 1-nerved, tip hyaline; III shorter, ovate obtuse glabrous nerveless; IV awn about \(\frac{1}{3}\) in., inconspicuously margined below. Pedicelled spikelets narrower than the sessile, hairs of callus half their length; gl. I 9-11-nerved; II 3-nerved; III oblong, long-ciliate, nerveless.—Sent by Lisbon as A. odoratus, but apparently very different from the description of that plant and from the specimons received in the strongly compressed and acutely keeled sheaths, broad leaves and inflorescence.

17. A. Woodrovii, Hook. f.; stems tall erect compressed, nodes glabrous, leaves long, sheaths compressed, spikes erect stipitate fascicled strict silky, joints and pedicels slender ciliate with long erect hairs, sessile spikelets $\frac{1}{6} + \frac{1}{6}$ in. oblong-lanceolate, callus hairs $= \frac{1}{4}$ of the spikelet, gl. I of sessile spikelet 8-12-nerved silky below the middle, tip truncate hyaline, keels ciliolate.

BOMBAY; Mawal, Woodrow (Herb. Bombay, n. 27).

Stems 3-4 ft., tufted on a woody rootstock, thicker than a goose-quill at the base and obtusely 2-edged, solid, stiff, branched above. Leaves 1-2 ft. by \(\frac{1}{2}\)-\(\frac{1}{6}\) in., rigid, surfaces and margins scaberulous, not pruinose beneath; sheath loose, keeled, quite smooth; ligule a truncate ciliate membrane. Spikes 3 5, \(\frac{1}{2}\)-1 in. long, pale, on slender but stiff smooth proper peduncles, \(\frac{1}{2}\)-\(\frac{1}{6}\) in. long; joints and pedicels linear, margins silky, upper hairs half as long as the spikelet. Sessile spikelets, callus rather long, obtuse; gl. I coriaceous, glabrous above the middle, margins narrowly incurved, nerves slender; II chartaceous, 3-nerved, ciliate; III ovate, acute, nerveless; glabrous; IV a simple awn \(\frac{1}{2}\)-\(\frac{2}{3}\) in. Pedicelled spikelets narrower than the sessile; gl. I 9-nerved, glabrous, keels scabrid; II 3-nerved, ciliate; III obovate, ciliate, nerveless; IV 0.—Apparently a very distinct species, of which better specimens are much wanted, the spikes being much broken. Mr. Woodrow observes that the odour is that of camphor.

- $\S\S$ Glume I of sessile spikelets usually quite glabrous (or hairy below the middle in A. pertusus).
- 18. A. pertusus, Willd. Sp. Pl. iv. 922; erect or ascending, nodes more or less bearded, leaves linear, sheaths terete, spikes 3-7 usually purple 1-2 in. digitately fascicled shortly stipitate slender silky, rachis fragile, joints and pedicels silkily ciliate, sessile spikelets 1-1 in. oblong-lanceolate minutely truncate usually shining glabrous or sparsely hairy below the middle 5-9-nerved usually 1-2-pitted dorsally callus shortly bearded, keels spinulosely ciliate above. Beauv. Agrost. 131, t. 23, f. 2; Br. Prodr. Fl. Austral. 201; Roxb. Fl. Ind. i. 258; Kunth Enum. Pl. i. 498; Steud. Syn. Gram. 364; Hack. Monogr. Androp. 479; Wight Cat. n. 1696; Thw. Enum. Pl. Zeyl. 367 (excl. Syn.) 437; Trim. Cat. Ceyl. Pl. 108; Aitchis. Cat. Panjab. Pl. 176 (excl. Syn.); Duthie Grass. N.W. Ind. 21 (excl. Syn), Fodd. Grass. N. Ind. 38, t. 25; Lisboa in Bomb. Journ. Nat. Hist. vi. (1891), 202; Nees Fl. Afr. Austr. 107; Benth. Fl. Austral. vii. 530; Baker Fl. Maurit. 445 (excl. some Syns.); Boiss. Fl. Crient. v. 464. A. angustifolius, Parl. Fl. Palerm. i. 269. A. panormitanus, Parl. Fl. Ital. i. 140. A. punctatus, Aitchis. in Journ Linn. Soc. xviii. (1881) 111 (not of Roxb.). Lepeocercis pertusa, Hassk. Pl. Jav. Rar. 52. Eleonurus pertusus. Nees mss. ex Steud. l. c. Holcus pertusus, Iinn. Mant. ii. 301.—Andropogon, Wall. Cat. n. 8804 A. B. C. D.

Drier parts of India; from the Panjab to Burma, and southward to CEYLON .-

DISTRIB. Westwards to Sicily; trop. Asia, Africa, and Australia.

Very variable in habit and stature, rarely 12 in. high, tufted, annual or perennial; stem sometimes creeping and rooting, usually ascending from a leafy base, slender, even filiform; nodes sometimes densely bearded. Leares 2-12 by \(\frac{1}{3}\)\to \(\frac{1}

a. genuinus; gl. I thin not shining more or less villous below the middle, spikes

3-9. -- Common.

β. Wightii; sheaths villous, nodes long bearded, spikes about 15.—"Panvanasum,"

Wight Cat. n. 1696.

e. longifolius; tall, erect, stout from a woody stock, 2-4 ft. high, nodes densely bearded, leaves 12-18 by 1 in. hairy, sheaths hirsute, lower spikes branched, spikelets quite glabrous, gl. I of lower spikelet coriaceous. A. Arnottianus, Nees in Wight Cat. n. 2338.—Audropogou, Wall. Cat. n. 8803.—Ceylon? Wight.—A very different looking plant from the other forms of A. perturus.

η. insculptus; sheaths glabrous, gl. I of sessile spikelets 1-2-pitted truncate, keels longer ciliate. A. insculptus, A. Rich. Tent. Fl. Abyss. ii. 458. A. bifoveolatus

& subunifovcolatus, Steud. Syn. Gram. 380.—Not uncommon.

19. **A. Foulkesii**, *Hook. f.*; stem erect or ascending very slender, nodes glabrous, leaves narrowly linear, sheaths terete, spikes 3-6 1-1 $\frac{1}{3}$ in. long digitately fascicled long-stipitate slender purplish, joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{6} - \frac{1}{6}$ in. oblong-lanceolate dorsally depressed in the middle line imperforate 7-nerved glabrous keels pectinately ciliate.

NILGHIRI HILLS, Wight; Kaity, Foulkes; Pykora, King.

Percunial. Stem 12-18 in. Leaves 6-10 by \$\frac{1}{6}-\frac{1}{4}\$ in., finely acuminate, glabrous or hispid on both surfaces with spreading hairs, midrib very strong; sheath glabrous, mouth and ligule villous with long hairs. Spikes 1-1\frac{1}{2}\$ in., special peduncles \$\frac{1}{2}-1\$ in., very slender, axils bearded with long soft hairs; joints and pedicels slender, flat with thickened margins and diaphanous centre. Sessile spikelets \$\frac{1}{2}-\frac{1}{2}\$ in., t*p 2-toothed, callus bearded; gl. I dorsally flattened or convex, nerves obscure or distinct; II scuminate, 3-nerved, keel scaberulous above, margins ciliate; III shorter, lanceolate, nerveless; IV awn \$\frac{1}{2}-\frac{3}{2}\$ in., capillary, palea 0. Pedicelled spikelet longer and narrower than the sessile; gl. I strongly 9-nerved.—Resembles A. Ischæmun, differing in the much shorter hairs of the joints and pedicels and glabrous spikelets.

20. A. concanensis, Hook. f.; slender, erect, leafy, leaves very narrow sheaths terete, nodes glabrous, spikes 5-8 2-2½ in. long loosely fascicled long-stipitate slender flexuous pale, joints and pedicels slender compressed not deeply sulcate sparsely shortly ciliate, spikelets ½ in. ovate- or oblong-lanceolate narrowly truncate glabrous 7-nerved keels very shortly ciliate.

BOMBAY, Woodrow (Herb. Bomb. n. 28).

Perennial. Stems many from a nodose stock, 28-24 in., firm, smooth, terete, leafy. Leaves 8-10 by \(\frac{1}{13}\cdot \frac{1}{3}\) in., finely acuminate, smooth on both surfaces; sheaths

smooth; ligule a ridge. Spikes very pale, rachis and proper peduncles filiform, glabrous, the latter \(\frac{1}{2}\)-\frac{1}{2}\) in. long, axils slightly bearded; joints and pedicels = \(\frac{1}{2}\) the lower spikelet, compressed, hardly grooved and not translucent in the centre, sides not thickened. Sessile spikelets small, callus hairs = \(\frac{1}{2}\) the gls.; gl. I thin, nerves very slender, keels ciliate with stiff very short bristles; II lanceolate, acuminate, ciliate, nerves 3 faint; III much smaller, oblong, obtuse, nerveless; IV, awn \(\frac{1}{2}\) in., capillary, base slightly dilated. Pedicelled spikelets narrower than the sessile, gl. I 9-nerved; II and III as in the sessile; IV small, oblong, often unequally 2-fid, ciliate, nerveless.—Although the pedicels of the upper spikelets and joints of the rachis are not as in typical Amphilophis, this appears to be the position of A. concanensis.

21. A. Runtzeanus, Hack. Monogr. Androp. 478; tall, nodes thickly bearded, leaves narrowly linear smooth, sheaths terete glabrous, spikes 12-15 $\frac{3}{4}-2$ in, long densely fascicled slender silky purplish, joints and pedicels plumosely ciliate with long hairs, sessile spikelets $\frac{1}{5}$ in linear-lanceolate, callus hairs $=\frac{1}{3}$ the spikelets, gl. I pitted or not 7-9-nerved keels subpectinately ciliate towards the 2-toothed tip.

The CONCAN and CENTRAL PROVINCES, Kuntze, Duthie.

Stem 3-5 ft., as thick as a goose-quill below, with 2-3 slender flowering branches above, terete, smooth. Leaves 10 in. and upwards by \$\frac{1}{6}-\frac{1}{4}\$ in., glabrous, glaucous, smooth, margins scaberulous, upper cauline short, rigid. Spikes corymbose, slender, flexnous, proper peduncles \$\frac{1}{4}-\frac{1}{3}\$ in., slender, glabrous; joints and pedicels = \$\frac{1}{2}\$ the lower spikelet or more, translucent in the middle line. Sessile spikelets narrow; gl. I quite glabrous, thin; II lanceolate, acuminate or mucronate, margins ciliolate; III lanceolate, glabrous; IV awn about \$\frac{1}{2}\$ in., base somewhat dilated. Pedicelled spikelets narrower than the sessile, male; gl. I strongly 9-11-nerved, keels ciliate scabrid at the entire tip; II 5-nerved; III ovate-oblong ciliate, nerveless; IV small, linear, or 0.

22. A. ensiformis, Hook. f.; stem erect stout compressed, nodes glabrous, leaves erect strict narrowly ensiform acuminate, sheath strongly compressed, spikes many in a thyrsiform fascicle shortly stipitate, joints and pedicels silky with long hairs, sessile spikelets \(\frac{1}{2} \) in ovate-oblong, callus hairs = \(\frac{1}{2} \) the spikelet, gl. I membranous dorsally flat 5-7-nerved very sparsely silkily villous towards the base, tip truncate keels minutely ciliate.

The CONCAN? Dalzell.

Stems 2 ft. and upwards, densely tuffed, base as thick as the thmub, with stout roots, clothed with the compressed equitant leaf-sheaths. Leaves 8-10 by \(\frac{1}{2}\) in., rigid, strongly nerved, glabrous or sparsely hairy, tips acicular, margins and both surfaces scaberulous; sheaths smooth, lower equitant; ligule short, scarious. Spikes \(\frac{1}{2}\)-\(\frac{1}{2}\) in., in an erect narrow thyrsus 3 in. long, pale purplish, proper peduncles \(\frac{1}{2}\)-\(\frac{1}{2}\) in.; joints and pedicels very slender, flat with a translucent channel, ciliate with very long erect hairs. Sessile spikelets, callus small; gl. I thin, shining, margins rather narrowly incurved, keels slender; II ovate-oblong, acute, 3-nerved, ciliate, not keeled; III narrowly oblong, ciliate; IV a very narrow entire or 2-toothed membranous dilatation of the base of the slender awn, which is \(\frac{1}{2}\)-\(\frac{3}{2}\) in. long. Pedicelled spikelets as long as the sessile, linear-oblong; callus naked; gl. I convex, manynerved; II 5-nerved; III linear-oblong, ciliolate; IV 0.—I have seen only a single specimen from the Herbarium of the late Mr. A. Dalzell, with no locality marked. The straight sword-shaped leaves are remarkable.

- ++ Spikes racemed or panicled, lower much shorter than the rachis of the inflorescence.
 - 23. A. intermedius, Br. Prodr. 20; inodorous, tall, leaves narrowly

linear, sheaths terete, rachis and branches of panicle glabrous, spikes fragile, joints and pedicels slender densely ciliate, sessile spikelets \(\frac{1}{6} - \frac{1}{6} \) in oblong-lanceolate acute, callus hairs very short, gl. I of sessile spikelets glabrous or sparsely hairy or hispid below pitted or not, keels scabrid towards the tip. Kunth Enum. Pl. i. 500; Steud. Syn. Gram. 392; Hack. Monogr. Androp. 485; Lisboa in Bomb. Journ. Nat. Hist. iv. (1889), & vi. (1891) 69, 202. A. pertusus, Thw. Enum. Pl. Zeyl. 367 (in part). P. A. Pseudischæmum, Duthie Grass. N.W. Ind. 21, Fodd. Grass. N. Ind. 88. A. fascioularis, Thw. l. c. 437; Trim. Cat. Ceyl. Pl. 108; Benth. Fl. Austral. vii. 531. Holcus montanus, Herb. Hom. ex Wall. Cat. n. 8805 C.—Andropogon, Wall. Cat. n. 8804 E, 8805, 8806, 8815 C.

Throughout India, from the Panjab (ascending the Western Himslaya to 8000 ft.) to Bengal and Arracan and southward to CEYLON.—DISTRIB. Westward

to the Caucasus, China, Malaya, and the Pacific. Trop. Africa.

Perennial. Stem 3-5 ft., stout or slender, slightly flattened on one side; nodes glabrous or hairy. Leaves 6-18 by \(\frac{1}{2} \) in., flat, glaucous, setaceously acuminate, ciliate towards the base; sheath hairy at the top; ligule very short, truncate. Panicle very variable in form and density, pyramidal thyrsiform or subcorymbosa, rachis and branches glabrous the latter usually in opposite pairs; spikes variable in length. Spikelets pale green or purplish; gl. I rather thin, obtuse or narrowly truncate, 4-7-nerved; II oblong or lanceolate, 3-nerved, keel smooth, margins glabrous; III = \(\frac{1}{2} \) I, oblong, glabrous, nerveless; IV a slender awn, 1-1\(\frac{1}{2} \) in. long, palea 0.—Pedicelled spikelets linear-oblong or lanceolate; gl. I 5-9-nerved, glabrous, keels ciliolate; II lanceolate, 3-nerved, ciliate; III shorter, oblong, glabrous, nerveless; IV 0.—A variable plant, nearest perhaps to a Kuntzeanus from which the paniculate inflorescence and smaller spikelets distinguish it. In some specimens the spikes are reduced to a few, and then the paniculate character disappears.

The following are Hackel's varieties of the Indian plant, which a larger series of specimens than he had access to tends to invalidate.—Roxburgh's A. punctatus and A. glaber (Anatherum glabrum, Schult. Mant. ii. 446) of both which there are good original drawings, do not fall under any of Hackel's vars. Both have pitted gl 1; A. glaber has few pikes on the branches of the panicle, A. punctatus has many long quite simple spikes on a rather short rachis. Hackel has given a plant of Duthie's from Simla, 7-8000 ft., the mss. name of var. himalayensis; it is, I think,

referable to var. caucasicus.

Var. genuinus; panicle 4-5 in. subsimple, branches with one or few spikes, gl. I not pitted appressedly hairy below, keels rigidly ciliolate. A. Vachelii, Nees in

Hook. & Arn. Bot. Beech. Voy. 243. Kumaon, Duthie (ex Hackel).

Var. Hænkii; panicle 5-6 in. compound, branches with 4-8 spikes, sessile spikelets ½ in., gl. I rarely pitted slightly depressed along the middle line, keels rigidly ciliolate. A. Hænkii, Prest Rel. Hænk. i. 340. A. Vachelii, β, Hook. & Arn. l.c. A. leptanthus, Steud. Syn. i. 391. Rhaphis stricts, Nees in Hook. Kew Journ. ii. (1850) 99.—Ceylon (C.P. n. 411 in part).

Var. caucasicus; panicle 3-4 in. subsimple, branches simple or subdivided, sessile spikelets † in., gl. I not pitted sparsely hispid below the middle. A. caucasicus, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1833) 286. Sorghum caucasicum. Griseb.

in Ledeb. Fl. Ross. iv. 476.—Black Mts., Duthie.

Var. punctatus; panicle 4-6 in. compound, branches with many spikes, sessile spikelets \(\frac{1}{2} - \frac{1}{2} \) in., gl. I pitted sparsely hairy below the middle, keels rigidly ciliolate.

A. punctatus, Trin. Sp. Gram. Ic. t. 328; Steud. Syn. Gram. 391 (an Roxb.?).

A. perfossus, Nees ex Steud. l. c.—Common.

P 25. A. montanus, Roxb. Fl. Ind. i. 267 (non Benth. & Hackel); tall, ascending from a stout creeping base, leaves long slender, panicle tall pyramidal, branches subverticilled capillary strict bearing one or several very slender elongate spikes, joints and pedicels sparsely hairy, spikelets

minute, gl. I not pitted sparsely hairy. Kunth Enum. Pl. i. 506. PA. saccharoides, Roxb. I. c. 263 (non Sw.).

NORTHEEN CIRCARS, Roxburgh.

Stem 3-4 ft., as thick as a large crow-quill, creeping and nodose below. Leaves remarkably long, a little hairy on the upper side near the base only; mouth of sheath bearded. Panicle 4-8 in., pale green .- There are two excellent drawings of this plant in Roxburgh's collection (Nos. 90 and 889) both marked A. montanus, in which the lower branches of the panicle are 3-nate, the rest alternate, all bearing several spikes of about an inch long. Two other of Roxburgh's drawings, n. 890 and 2017, of which the latter bears the name of saccharoides, represent a plant differing apparently from montanum only in the panicle being composed of simple shortly pedicelled much longer spikes. The difference between the two forms is analogous to what occurs in A. intermedius, from which A. montanus differs in the mach more slender pale green panicle, and spikes with minute spikelets, and in the capillary joints and pedicels not being represented as compressed and as being laxly covered with distant long spreading hairs. As to this latter character, which is uniform in all four drawings, allowance must be made for native artists' work. I have seen no plant resembling this species, which is a native of a region botanically mexplored since Roxburgh's day. It has obviously no affinity with that which Hackel, following Bentham, has described as montanus, Roxb., and which plant Roxburgh probably never saw.

26. A. odoratus, Dna. Lisboa in Journ. Bomb. Nat. Hist. Soc. iv. (1889) 123, cum Ic. & vi. (1891) 68, 203; aromatic, stem stout, nodes villous, leaves long broad, sheaths compressed, spikes few or many densely fascicled stipitate silky purplish, rachis and branches glabrous, sessile spikelets 1-1 in., callus densely silky, gl. I oblong-lanceolate truncate 7-nerved rarely pitted villous below the middle keels scaberulous.

The DECCAN; Khandeish, Poons, &c., Lisboa,

Stem 3-4 ft., as thick as a swan's quill at the base, sparingly branched, leafy. Leaves 1-2 ft., by \(\frac{1}{6}\)-\frac{1}{2}\) in., flat, acuminate, scaberulous on both surfaces and on the margins, bright green, nerves strong; sheath long, glabrous, smooth, upper sheathing the base of the inflorescence; ligule membranous, truncate. Panicle 2-4 in.; branches filiform and spikes 1-2 in. suberect, slender, flexuous; spikes rather tenacious, joints and pedicels flattened with a translucent centre, tips truncate. Sessile spikelets, callus-hairs half as long as the gls.; gl. I thin, rarely pitted, nerves slender, tip truncate, hyaline, nerveless; II keeled, thin, obtuse or truncate, ciliate; III shorter than II, ovate-lanceolate, eclilate, nerveless; awn about \(\frac{1}{2}\) in., faintly dilated towards the base. Pedicelled spikelets as long as the sessile or rather longer; gl. I narrow, many-nerved, dorsally glabrous; II 3-nerved, ciliate; III shorter, oblong, obtuse, nerveless, ciliate.—The compressed sheaths, panicled spikes, villous gl. I of the sessile spikelets, and aroms, seem to distinguish this from A. Kuntseanus, which it strongly resembles in a dry state.

- ** Pedicels of upper spikelets and joints of rachis subterete, not or obscurely channelled, with no translucent centre. (See also 20. concanensis.)
- 27. A. fascicularis, Roxb. Fl. Ind. i. 265; annual, slender, leaves linear, sheaths hardly compressed, panicle oblong, branches subsolitary flowering almost to the base sparingly divided, spikes slender subsessile, joints and pedicels linear subterete or compressed not channelled shortly rigidly ciliate, sessile spikelets \(\frac{1}{2} \) in., gl. I ovate-lanceolate flat smooth scabrous or shining 7-9-nerved keels shortly ciliate towards the

truncate tip. Steud. Syn. Gram. 392; Hack. Monogr. Androp. 541. A. gangeticus, Hack. l.c. 539.—Andropogon, Wall. Cat. n. 8816.

TROPICAL HIMALAYA, from Garwhal to Sikkim. Lower Bengal, Assam, the Central Provinces, and Burma.—Distrib. Tonkin.

Stem 2-3 ft., decumbent and branched below, leafy, nodes glabrous or nearly so. Leaves 12-16 by 1-18 in., glabrous or hairy, base narrowed, setaceously acuminate. scaberulous; sheath hirsute or subglabrous, mouth bearded; ligule shortly ovate, Panicle 1-2 in., long-peduncled, usually narrow, green or purplish; rachis slender, glabrous or nodes bearded; branches erect, lower usually binate covered to the base Spikes 1-1 in.; joints few, flattened but not 2-ribbed, ciliate with with spikes. white or purple hairs. Sessile spikelets dorsally flattened, callus bearded; gls. thin, I glabrous on back and sides, margins involute, nerves very slender; II chartaceous, acute, 5-7-nerved; III lanceolate, 2-nerved, ciliate; IV much shorter, 2-fld, lobes triangular, ciliate; awn } in. long; palea 0, or minute, broadly ovate. Ovary glabrous. Pedicelled spikelets neuter, narrower than the sessile; gl. I many-nerved, keels scaberulous; II acute, 7-nerved; III obovate-oblong, ciliate.—A good character of this species is the branches of the panicle bearing spikelets down close to the Hackel (who doubtfully places this in his subgenus Sorghum) describes gl. IV of the sessile spikelet as having a lanceolate acuminate glabrous nerveless palea as long as the gl.; no doubt an error.

28. A. venustus, Thw. Enum. Pl. Zeyl. 367; stems tall, leaves narrow, sheaths hardly compressed, panicle elongate interrupted, rachis and spreading opposite and alternate branches capillary glabrous, spikes small, joints 3-8 and pedicels very slender glabrous terete not channelled, sessile spikelets narrowly lanceolate acute, gl. I dorsally compressed nerveless tip 2-toothed, keels scabrid above the middle, II very shortly awned, keel smooth or scabrid upwards. Hack. Monogr. Androp. 545; Trim. Cat. Ceyl. Pl. 108.

CEYLON; Central Province, alt. 4000 ft., Thwaites.

- Stem 2-4 ft., strict, subsimple, as thick as a goose-quill below and clothed with short pubescent sheaths. Leaves 12-16 in., smooth or scaberulous above, midrib very broad and prominent beneath; sheath subcompressed, smooth; ligule a ridge of hairs. Panicle 12-16 in., dull purplish, much branched. Spikes narrow, lax-fld., joints 3-8 and pedicels = \frac{1}{2} the sessile spikelets. Sessile spikelets \frac{1}{2} in., slightly curved; callus small, stellately bearded with white hairs; gl. I quite smooth, flat or rather convex dorsally; II chartaceous, linear-lanceolate, acuminate, 3-nerved, keel acute; III smaller, ovate, acuminate or aristulate, ciliate above, 1-3-nerved; IV linear, 2-fid, awn very slender. Pedicelled spikelets longer than the sessile and more acuminate, nearly glabrous, male; gl. I 7-nerved, 3 towards the margin on each side; II and III as in the sessile; IV narrow, glabrous, awn 0.—Hackel, who places this in subgen. Vetiveria, describes gl. I of the pedicelled spikelet as 5-nerved. The habit spikelets and glumes are those of subgen. Amphilophis, but the joints and pedicels are not channelled. Duthie (Grass. N.W. Ind. 22) gives the Jhelum Valley, Stewart, as a habitat, doubtless erroneously.
- B. Spikes small, of 1-3-rarely 4 pairs of spikelets, often reduced to 3 spikelets, a sessile and 2 pedicelled. Panicle more or less pyramidal, rachis and branches capillary.
- 29. A. micranthus, Kunth Revis. Gram. i. 165, Enum. Pl. i. 504; stem erect or ascending simple or nearly so, leaves linear base hardly narrowed sheaths closed, spikes of 2-3 pairs of spikelets, joints and pedicels shortly ciliate or subglabrous, sessile spikelets $\mathbf{1}_{0}^{1}-\mathbf{1}_{0}^{1}$ in., gl. I linear-oblong dorsally channelled glabrous scaberulous or villous, keels minutely subpectinately ciliate. Steud. Syn. Gram. 396; Hack. Monogr.

Androp. 488; Lisbea in Journ. Bomb. Nat. Hist. Soc. iv. (1889), vi. (1891) 69.

A. alternans, Prest Reliq. Hænk. i. 342; Kunth Enum. l. c. 502. A. corulescens, Kunth l. c. 504. A. capilliflorus, Steud. in Zoll. Syst. Verz. 58.

A. parvispica, Steud. l. c. 397. A. serratus, Miq. Prolus. Fl. Jap. i. 192.

Anatherum parviflorum, Spreng. Syst. i. 290. Chrysopogon violascens, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1893) 319. Sorghum parviflorum, Beauv. ex Roem. & Sch. Syst. ii. 840. Rhaphis corulescens, Desv. Opusc. 69.

R. microstachya, Ness ex Steud. l. c. 397. Holcus corulescens, Gaud. in Freyc. Voy. Bot. 411, t. 27. H. parviflorus, Br. Prodr. 199.

WESTERN HIMALAYA, from the Ravi to Kumaon, alt. 4-6000 ft. Khasia Hills, alt. 5000 ft., Clarke. The Nilghiri, Concan and Decoan Hills.—Distrib. E. Asia and Malaya, Australia, S. Africa.

- Stem 2-3 ft., as thick as a crow-quill or thicker, terete, nodes more or less bearded. Leaves 6-12 by 1-1 in., setaceously acuminate, flat, more or less hairy with tubercle-based hairs, surfaces and margins scaberulous, base rounded : sheaths tight; ligule short, truncate. Panicle 2-6 in., oblong or pyramidal; rachis and branches spreading, perfectly smooth, flexuous. Spikes 1-1 in., pale yellow violet or red-brown, joints and pedicels slender often ciliate on one margin only. Spikelets small, callus stellately bearded; gl. I narrowly truncate, 4-6-nerved, scaberulous in all the specimens I have examined; margins narrowly inflexed; II lanceolate, acuminate or mucronate, scaberulous, 1-3-nerved; III short, obtuse, eciliate, nerveless; IV awn 1-3 in. Pedicelled spikelets male, callus naked; gl. I oblong, 7-nerved, margins hardly inflexed; II oblong, obtuse, 3-5-nerved; III oblong, hyaline; IV narrow, awnless.—Spikes often reduced to 3 spikelets, a sessile and 2 pedicelled males.—I have not cited Hackel's synonymy and authorities for the non-Indian forms with more spikelets in each spike. It is very difficult to distinguish A. micranthus from small forms of A. assimilis. I have seen no specimens from Lisboa.

Var. villosulus, Hack. l. c. 490; usually much stouter, sheaths bearded at the nodes and leaves hispidly hairy, gl. I of sessile spikelets often hispidulous. A. villosulus, Steud. Syn. Gram. 397; Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 69—(villosus). Chrysopogon villosulus, Nees ex Duthie Grass. N.W. Ind. 23 (excl. some Syns.). C. montanus, Duthie Fodd. Grass. N. Ind. 40. Rhaphis villosula, Nees ex Steud. l. c.—Kumaon, Royle, &c. Rajputana, Mt. Aboo, Duthie. Behar, on Parusnath, J. D. H., &c. Khasia Hills, Griffith.

30. A. assimilis, Steud. in Zoll. Syst. Verz. 58; Syn. Gram. 397; suffruticose, fastigiately branched from a decumbent base, leafy, leaves linear-lanceolate much narrowed to the base, lower sheaths open, branches of pyramidal panicle capillary at length widely spreading, joints and pedicels shortly ciliate, sessile spikelets r_{10}^{-1} , in., gl. I oblong or linear-oblong narrowly truncate glabrous or silkily villous below the middle 2-5-nerved between the shortly pectinately ciliate keels. Mig. Fl. Ind. Bat. iii. 489. A. montanus, Benth. Fl. Hongk. 423 (excl. Syn.); Hack. Monogr. Androp. 491 (excl. Syn.); Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 203. A. capillaceus, Wall. mss. A. glaucopsis & subrepens, Steud. l. o. Chrysopogon pictus. Hance in Ann. Sc. Nat. Ser. 5, v. (1866) 252. C. glaucopsis, Duthie Grass. N.W. Ind. 22. Rhaphis repens, Nees ex Steud. l. c.—Chrysopogon, Wall. Cat. n. 8781, 8786, 8787, 8790.

TEMPERATE HIMALAYA, from Kashmir to Sikkim, ascending to 5°00 ft. The Khasia and Munnepore Hills. Behar; on Parusnath, alt. 4000 ft. Burma, Wallich. Rajpootana, Duthie. The Deccan and Central India, King, &c.—Distrib. Java, China, Japan.

Stems 6 to probably 12 ft. or more; as thick as a goose-quill at the base, hard, shining, sometimes proliferously branched here and there, nodes more or less bearded.

Leaves 2\frac{1}{2}-6 by \frac{1}{10}\frac{1}{6} in., setaceously acuminate, rather flaccid, glabrous or sparsely hairy on both surfaces, margins subserrulate; sheaths usually bearded at the mouth, upper appressed, lower open and often divaricate; ligule obscure. Panicle 2-5 in., triangular, ternately branched; rachis and branches capillary, glabrous, axils more or less bearded. Spikes \frac{1}{2}\frac{1}{2} in., joints and pedicels very slender, hairs not longer than the joint. Spikelets pale green; gl. I membranous, margins incurved sometimes cil ate with a few very long hairs, flat or concave towards the centre; II acute margins nearly glabrous, keel flattened ciliolate above; III ovate, obtuse, glabrous; IV awn \frac{1}{2}\frac{1}{2}\in., slender, base acute. Pedicelled spikelets larger than the sessile, male or neuter; gl. I linear-lanceolate, green or reddish, glabrous or ciliate, 7-nerved, keels ciliolate; II 3-5-nerved; III \frac{1}{2}\shorter, oblong, glabrous, nerveless; IV 0.—I have seen no Javanese or other authentic specimens, and hence assume the correctness of Hackel's identification of the Indian plant with it. It is certainly not Roxburgh's A. montanus.

31. A. Hugelii, Hack. Monogr. Androp. 492; stem erect branching from the base, nodes bearded, leaves much narrowed below or peticled linear scaberulous, panicle ovate-oblong, spikes with 2-3 pairs of spikelets, joints shortly ciliate, sessile spikelets \(\frac{1}{3}\rightarrow\) in., gl. I oblong or oblong-lanceolate glabrous or villous below the middle 7-nerved tip truncate keels ciliate with long hairs, III minute ovate. Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 69.

WESTERN HIMALAYA? Huegel. RAJFOOTANA, on Mt. Aboo, King, &c. CENTRAL INDIA and the CENTRAL PROVINCES, Duthie, &c.

Stem shortly creeping or suffritescent below, often red, branches $2\frac{1}{2} - 3\frac{1}{2}$ ft. Leaves 4-10 by $\frac{1}{3} - \frac{1}{2}$ in., acuminate, puberulous beneath, margins scaberulous sometimes ciliate with long hairs; sheath slightly compressed; ligule short, membranous, ciliate. Panicle 2-3\frac{1}{2} in., shining, branches capillary, axils softly bearded. Spiker about \frac{1}{2} in. long, green or purplish; gl. I of sessile spikelets truncate, chartaceous, dorsally polished, margins narrowly incurved, cilia of keels very variable in length; II glabrous, truncate, apiculate, ciliate, keel much thickened; III minute, ovate, glabrous; awn of IV \frac{1}{2} in., base very slender. Pedicelled spikelets rather longer than the sessile, lanceolate, green or purple; gl. I 9-11-nerved, keels and back ciliate; II as long, acuminate, 5-nerved, ciliate; III nearly as long, hyaline, oblong, obtuse, glabrous; IV very narrow.—I have seen no typical specimen of this plant which Hackel described from Huegel's specimens, of which the habitat is unknown. The gl. III he describes as absent, an oversight, as it is present m spikelets of the type kindly procured from Vienna for me by Dr. Stapf, and in those collected by King, Duthie and others. Lisboa l. c. 69 describes a var. fætidus, Hack. mss. as common all over the Bombay Presidency, and as having a soft and very pleasant smell. I fail to find any characters in the specimens I have examined, or in the descriptions given, to distinguish it from A. Hugelii, except that according to Lisboa the pedicelled spikelet of fætidus has no gl. IV.

32. A. Schmidii, Hook. f.; stems subsimple or branching below, ascending leafy, nodes bearded, leaves lanceolate acuminate rigid scabrid above base suddenly contracted, sheaths terete smooth, panicle contracted, branches short erect, sessile spikelets broadly oblong obtuse convex 5-7-nerved between the very shortly ciliate and sparsely hairy keels, margins narrowly incurved, II broadly oblong glabrous 3-nerved, III very small ovate, IV a slender awn.

NILGHIEI HILLS; Schmid; Nadavatum, in pastures, alt. 6000 ft., Lawson.

Stem 3-4 ft., rather stout, red-brown, smooth. Leaves 3-5 by 1-1 in., finely acuminate, midrib strong, scabrid above with sometimes tubercle-based bristles, scaberulous beneath, margins scaberulous; sheath long, mouth bearded; ligule obscure. Paniels 2-4 in., loosely or densely branched; branches and branchlets

Andropogon.

smooth. Spikelets brown or dull green, callus short, broad, shortly bearded; gl. I rather coriaceous, dorsally shining, smooth or scaberulous; II chartaceous: III broadly ovate, obtuse, nerveless; IV awn ‡ in., very slender. Pedicelled spikelets narrower; pedicels shortly ciliate; gl. I 9-nerved, ciliate all over; II narrowly lanceolate, 5-nerved, margins ciliate; III oblong; IV 0.—A stouter grass than the foregoing, with very scabrid leaves and much broader spikelets. Allied to A. microsthus, differing conspicuously in the rigid scabrid foliage.

33. A. filiculmis, Hook. f.; annual, stem elongate filiform flaccid much branched, nodes bearded, leaves 2-4 in linear-lanceolate finely acuminate flaccid base suddenly narrowed, sheaths lax lower open, panicle long-peduncied lax-fld., rachis and branches capillary, pedicels of upper spikelets ciliate with long hairs, sessile spikelets $\frac{1}{10-\frac{1}{8}}$ in oblong-lanceolate obtuse 5-7-nerved between the keels villous below the middle or all overkeels ciliate with long slender hairs.

The DECCAN; Poonah, in rocky places, Jacquemont (n. 310); MAWAE; Dhom-sha, Woodrow (Herb. Bomb. n. 26.)

Stems 2-8 ft., apparently decumbent and interlaced, copiously geniculately branched throughout, quite glabrous, very weak, internodes long pubeacent. Leaves pale green, \(\frac{1}{2}\) in. broad, tip filiform, glabrous or sparsely hairy beneath, margins smooth ciliate towards the very narrow base, costa and nerves very slender; sheaths long, narrow, spreading at the ramifications, glabrous, bearded at the top; ligule broad, membranous, ciliate. Panicle 1-2 in., branches few of extreme slenderness. Spikelets pale green or white; callus densely shortly villous; gl. I of sessile membranous, nerves faint; II oblong, truncate, mucronate, 3-nerved, glabrous; III very small, ovate, nerveless, eciliate; IV, awn \(\frac{1}{2}\)-\(\frac{1}{2}\) in., column brown twisted. Pedicelled spikelets narrower than the sessile; gl. I lanceolate, tip truncate mucronate, 7-9-nerved; III broadly oblong, hyaline, nerveless; IV 0.—A very delicate grass. The sessile spikelets of Jacquemont's specimens are nearly glabrous, of Woodrow's densely villous, with snow-white hairs.

34. A. pteropechys, Clarke in Journ. Linn. Soc. xxv. (1889) 88, t. 38; stem very slender, nodes bearded, leaves very narrow, upper sheath spathiform, panicle subpyramidal, branches few capillary villous beneath the few pale brown spikes, spikelets 3-5, joints and pedicels shortly ciliate, sessile spikelets \(\frac{1}{2} \) in., gl. I oblong obtuse 9-nerved glabrous keels pectinately ciliate for the upper \(\frac{2}{3} \). Monogr. Androp. 690.

MUNNEPORE; on Jakpho and Kohima, alt. 5500-7500 ft., Clarke.

Perennial. Stem 2-3 ft. erect from a creeping rootstock, sparingly branched, leafy upwards, nodes thickly bearded. Leaves 3-6 by 1-1 in., finely acuminate, narrowed towards the base, above and margins scaberulous; beneath sparsely hairy; sheaths closed, glabrous; ligule very short, ciliate. Panicle 2-3 in.; branches 3-6, ascending, flexuous, glabrous except below the spikes where they are villous with brown hairs. Spikes 1-1 in.; pedicels of upper spikelets very slender, -1 the sessile spikelets and joints grooved. Spikelets erect, callus hairs -1 the spikelet; gl. I dorsally quite glabrous; II ovate-lanceolate, acute, 3-nerved, ciliate; III small, ovate, nerveless; awn 1 in., capillary, base acute. Pedicelled spikelets narrower than the sessile; gl. I 9-11-nerved; II 3-nerved; III oblong, obtuse, glabrous, nerveless.

Subgen. VI. Sorghum, Hack. Spikes panieled, tips of branchlets of paniele not bearded, joints I or few and pedicels filiform not or obscurely grooved ventrally, tips truncate. Spikelets few, often large, more or less dorsally compressed, broadly oblong ovoid or lanceolate; callus short; gl. I of sessile spikelets coriaceous, often shining, margins narrowly inflexed

above, involute below; II awnless; III hyaline, 2-nerved; IV entire or 2-fid and awned in the cleft, rarely awnless. *Lodicules* (in the Indian species) ciliate.

35. A. halepensis, Brot. Fl. Lusit. i. 89; perennial, tall, stout or slender, panicle decompound, rachis of spike fragile, joints bearing a circular scar with entire margins, pedicelled spikelets usually male about as long but narrower than the sessile, pedicel = 1 the sessile spikelet. Sibth. Fl. Greec, i. t. 68: Kunth Enum. Pl. i. 502, Suppl. 412, t. 40, f. 1; Steud. Syn. Gram. 394; Thw. Enum. Pl. Zeyl. 366. A. arundinaceus, Scop. Fl. Carn. Ed. ii. 274. A. avenaceus, H. B. & K. Nov. Gen. & Sp. i. 189. A. controversus & dubitatus, Steud. Syn. Gram. 391, 394. A. laxus, Roxb. Fl. Ind. i. 271 (non Willd.). A. miliaceus, Roxb. l. c. 272; Hack. Monogr. Androp. 541. A. miliformis, Schult. Mant. ii. 448. A. Sorghum, subsp. halepensis, Huck. l.c. 501. Sorghum capense, Herb. Heyne ex Wall. Cat. n. 8778 C. S. dubium, C. Koch in Linnea, xxi. (1848) 443. S. giganteum, Edgew. in Journ. As. Soc. Beng. (1852) 181. S. halepense, Pers. Syn. 101; Reichb. Ic. Fl. Germ. t. 54; T. Nees Gen. Fl. Germ. Monocot. i. n. 54, t. 91; Nees Fl. Afr. Austr. 88; Griseb. Fl. Brit. W. Ind. 560; Benth. Fl. Austral. vii. 540; Wall. Cat. n. 8778; Trim. Cat. Ceyl. Pl. 108; Aitchis. Cat. Panjab. Pl. 175; Duthie Grass. N.W. Ind. 23, Fodd. Grass. N. Ind. 40, t. 27. S. saccharatum, Hohen. Pl. Nilghiri, n. 1284 (non Pers.). S. Schreberi, Tenore Fl. Neap. Syll. App. iv. 4. Blumenbachia halepensis, Koel. Descr. Gram. 29. Trachypogon avenaceus, Nees Agrost. Bras. 354. Holcus halepensis, Linn. Sp. Pl. 1047; Host Gram. Austr. i. t. 1; Schreb. Beschr. Græs. i. t. 18; Jacq. Eclog. Gram. t. 48. H. decolorans, Willd. Sp. Pl. iv. 931. H. Catamucha, Ham, ex Wall, Cat. n. 8778 F.

Throughout India, Burma and Ceylon in open places.—Distrib. Most warm countries.

Roots creeping, stoloniferous. Stem 3-15 ft., erect, leafy, simple or branched, nodes pubescent. Leaves 8-18 in., or more, up to 3 in. broad, narrowed to the rounded base, tip filiferous, glabrous except towards the often villous base, flat or waved, midrib broad, margins scabridly serrulate; sheath terete; ligule rounded. Paniele 6 in. 2 ft., very variable in form and amount of ramification, typically pyramidal with long subcrect or spreading or drooping whorled branches, axils often bearded. Spikes of 1-3 rarely 5-7 pairs of spikelets, sometimes reduced to a triplet of a sessile fertile and 2 pedicelled male rarely neuter spikelets, joints of rachis and pedicels angular or compressed, glabrous or shortly ciliate. Sessile spikelets + to nearly + in., usually lanceolate, green or purplish, callus sparsely bearded; gl. I with involute sides embracing the others, more or less silkily hairy, rarely glabrous, 5-11-nerved above, there keeled and ciliate tip depressed or not hyaline; II subcoriaceous, chartaceous and keeled above, margins ciliolate; III shorter, elliptic-oblong, hyaline 2-nerved; IV smaller, ovate, obtuse, entire or 2-fid, awned or not, awn 1 in. or shorter; palea linear-oblong, obtuse, ciliate. Pedicelled spikelets linear-lanceolate, gl. I glabrous, 5-9-nerved, margins inflexed, keels subpectinately ciliate; II lanceolate, 3-5nerved; III and IV, if present, hyaline.—I have restricted the synonymy of this grass chiefly to Indian names, and those under which good figures are given. It is no doubt the wild form of the following (A. Sorghum) and its grain has long been used by natives of India. But whether the Sorghum form originated from cultivation of the wild in India, or in Africa, where both are very common, can be only a matter of conjecture. Both seem to be now cultivated in India according to Watt (Dict. of Economic Products of India) and others, and transition forms are frequent. Hackel, who treats A. halepensis as a subspecies of A. Sorghum, subdivides it under 5 varieties and 6 subvarieties, founded on characters too variable for use. Dr. Stapf, who has studied the African species as well as the Indian, proposes 2 varieties, or

rather prevalent forms, between which transitions occur, both vary in habit and in having awned mucronate or swnless spikelets; they are a. genuinus, of which miliaceus, Roxb., may be regarded as the type with sessile spikelets $\frac{1}{2}$ - $\frac{1}{6}$ in. long, it is Wall. Cat. n. 8778 A. B. C. And b. effusus, with sessile spikelets $\frac{1}{2}$ nearly $\frac{1}{2}$ in., it includes A. lasus, Roxb., A. halepensis, Wight Cat. n. 1672, and Wall. Cat. n. 8778 D. E. F. H.

36. A. Sorghum, Brot. Fl. Lusit. i. 88; annual, tall, usually very robust, panicle decompound usually thyrsiform with crowded whorls of erect branches and branchlets and spikes rarely subeffuse, rachis of spike tenacious, joints when forcibly separated leaving a ragged scar at the tip, pedicelled spikelets usually neuter, pedicels short. Roxb. Fl. Ind. i. 273; Kunth Enum. Pl. i. 581; Steud. Syn. Gram. 393. A. Sorghum, subsp. sakivus, Hack. Monogr. Androp. 505. Holcus Sorghum, Linn. Sp. Pl. 1047; Gærtn. Fruct. ii. 2, t. 80; Lamk. Encycl. t. 838; Grah. Cat. Bomb. Pl. 238; Dalz. & Gibs. Bomb. Fl. Suppl. 99.

Cultivated throughout the warmer parts of Europe, Asia and Africa.—Intro-

duced into America, Australia, &c.

Under A. halepense I have alluded to A. Sorghum as the cultivated form of that plant. Of the early history of its culture nothing is recorded, it having no Sanskrit name, and there is no evidence of its being known to the ancients of Europe or the East. Variable as it is, its forms appear to be much less fixed than those of wheat and barley, which gives rise to the suspicion that they are of comparatively recent origin. Many authors have endeavoured to limit by botanical characters some or all of its known varieties, and more have applied specific names to forms they could not, or did not try to identify with known ones. The result is a redundancy of names, and an inextricable synonymy. Watt's "Dict. of Economic Products of India" has treated in great detail the culture of many varieties, but under names that have little or no significance. Hackel has essayed to clean this Augean stable, and has devoted 15 pages of his Monograph to the forms of A. Sorghum, of which he describes 37 varieties and 12 subvarieties. His earnest and meritorious attempt has the great advantage of approximately harmonising most of the Indian citations and synonyms, and I therefore give a précis of it. It, however omits characters of the glumes which Dr. Stapf, in working up the African forms, has studied, and which characters appear to be of far more importance than those relied on by Hackel. Unfortunately it is not possible to combine the two classifications, for the obvious reason that Stapf's characters have been neglected in the descriptions of previous investigators, and it remains for the Indian botanists in this case, as in that of Pennisetum typhoideum, and indeed many other cultivated plants, to remove this reproach to Indian botany. Hackel's Indian varieties are as follow:-

Var. Roxburghii, Hack. l. c. 510; panicle lax ovate-oblong, rachis elongate, branches drooping, sessile spikelets ovate awnless, gl. I keeled in the upper third, grain white.—A. saccharatus, Roxb. Fl. Ind. i. 271; Dals. & Gibs. Fl. Suppl. 99 (non Kunth).

Var. Wightii, Hack. l. c. 511 characters of var. Rozburghii, but panicle more dense, branches scabrid, spikelets broadly elliptic, gl. I hairy in the upper half.

Herb. Wight n. 185.

Var. vulgaris, Hack. l. c. 515; panicle dense, branches erect or erecto-patent, sessile spikelets & in. obovoid or subglobose obtuse awned; A. Sorghum, Rowb. l. c. 269; Sorghum vulgare, Pers. Syn. i. 101; Reichb. Ic. Fl. Germ. t. 80; Duthie Grass. N.W. Ind. 23, Field & Gard. Crops. 25, t. 6, Fodd. Grass. N. Ind. 41; Holous Sorghum, Linn.

Var. cernuss, Koern. Handb. Getreit. i. 314; very robust, panicle drooping ovoid obtuse compact, rachis and appressed branches short subcrect subvillous, sessile spikelets 1-1 in. broadly obovoid or rhomboid obtuse awned whitish densely silkily villous or glabrescent dersally, grain globose white with a black

hilum. A. cernuus, Kunth l. c. (escl. Syn. Rosb.). A. compactus, Brot. l. c. 88; Sorghum cernuum, Host Gram. Austr. iv. t. 3; Reichb. Ic. Fl. Germ. t. 80. Holeus cernuus, Ard. in Sag. Sc. e Lett. Acad. Padua, i. 12, t. 3, f. 1, 2.—S. saccharatum, Strachey & Winterbottom, from Kumaon, alt. 5000 ft. is a proliferous state.

Var. glabrosus, Hack. l. c. 517; panicle ovoid compact at length straw-colrd., sessile spikelet 1 in, suborbicular not awned villous.—Serampore. Voigt (in Herb.

Copenhagen.)

Var. miliformis; (not A. miliformis, Schult.); panicle dense, sessile spikelets ; in. suborbicular at length straw-colrd. strigosely hairy, gl. IV with an exserted

mucro, grain dark brown or violet brown.

Var. bicolor, Hack. l. c. 519; panicle very dense, sessile spikelets $\frac{1}{6}$ in. obtusely hexagonal awnless at length black, gl. I coriaceous below the middle, then deeply rugg. d, upper part striate hairy, grain almost twice as long as the gl. white. PA. bicolor, Kunth l. c. 501, non Rosb; PA. cernuus, Rosb. Fl. Ind. i. 270. PSorghius bicolor, Wilds. Enum. Hort. Berol. 1036. PHoleus bicolor, Linn. Mant. ii. 301.—Deccan Peninsula, Herb. Wight n. 185 B.

Dr. Stepf's arrangement of the Indian forms (including many of the African) is the following. I do not cite the habitats and synonyms of the varieties given by Hackel, for to do so might include plants to which the characters adopted by Dr. Stapf n ay not apply:—

Glume I of sessile spikelets not depressed below the tip.

Var. hians, Stapf; gls. I and II divaricate exposing the white grain, tip of gl. I

coriaceous.—S. vulgare, Pers. B. Wight Cat. n. 1670 (not in Hackel.)

Var. Rozburghii; Hack. l.c. 510; tip of gl. I hyaline, nerves obscure, sessile spikelets 1 in. ovate acuminate awnless.—Wall. Cat. n. 8777 D. (the right hand specimen) F. H.

Var. saccharatus, Koern.; spikelets ; in. ellipsoid acute or apiculate awned, tip

of gl. I hyaline, nerves obscure.

- · Var. Thomsons, Stapf; spikelets 1 in. ovate, gl. I strongly nerved below the tip.

 —A single specimen from Upper Gangetic Plain, Thomson.
- ** Glume I of sessile spikelets depressed below the tip, nerves distinct up to or near to the base.

Var. nervosus, Stapf; Hack. l. c. 518.—S. India, Herb. Rottler.

*** Glume I of sessile spikelets depressed below the tip, nerves distinct below the tip only.

Var. obougius, Hack. 1. c. 514; panicle very loose, gl. I and II at length more or

less black and shining .- Wall. Cat. n. 8777 E. J. L.

Var. vulgaris, Hack. l. c. 515; panicle erect contracted, gl. I of sessile spikelets in acute depressed and triangular for the upper \(\frac{1}{2}\).—Wall. Cat. n. 8777 A; O is a form with smaller spikelets, only \(\frac{1}{2}\) in long.

Var. milisformis, Hack. l.o. 518 (not A. miliformis, Schult.); panicle erect contracted, gl. I of sessile spikelets 1 in. truncate depressed part very narrow reddish.

Var. cernus, Koern.; Hack. l. c. 576; very robust, panicle forming a dense ovoid or oblong cernuous or decurved head, sessile spikelets small almost orbicular usually tomentose.—Wall. Cat. n. 8777 B. G. K.

37. A. Stapfii, Hook. f.; annual, stems short branching from the leafy base, leaves 2-3 in. linear-oblong acute base cordate, panicle erect slender loose, branches few short erect, spikelets few \(\frac{1}{4}\) in. ovoid erect acute silkily villous with white hairs, gl. I ovate 9-11-nerved tip 2-toothed, and II very coriaceous.

TINNEVELLY, at Palamcottab, Wight.

Stems many, 12-16 in., spreading from the fibrous roots; geniculately ascending,

quite smooth. Leaves $\frac{1}{4}-\frac{1}{3}$ in. broad, flaccid, flat, margins smooth, nerves 3-5 on each side of the slender midrib; sheaths of lower short open, of the upper long rather loose, quite glabrous; ligule very short, membranous, glabrous. Panicle 2-4 in.; rachis and branches stiff, angular, subscaberulous, rather stout, green. Spikes of 1-3 pairs of rather distant white spikelets; joints = \frac{3}{4} the sessile spikelet, stout, shortly villous truncate, pedicels=\frac{1}{4} the spikelet, more slender. Sessile spikelet terete; callus very short, stellately bearded with white hairs; gl. I and II very coriaccous both with strongly incurred sides, nerves very slender with many cross-nervules; III oblong, truncate, hyaline, 2-nerved, ciliate; IV short subrhomboidal, cleft to the middle into triangular acute ciliate lobes; awn in the cleft \frac{3}{4} in., smooth, slender; palea linear-oblong, ciliate, nerveless. Anthers long. Pedicelled spikelets very narrow, imperfect, neuter, gl. I lanceolate, 9-nerved, bicuspidate; II shorter, 5-nerved.—A closely allied species, with similarly densely silky white spikelets, has been collected by Lunt in Southern Arabia, where it is stated to be cultivated. It is a stout plant with much larger leaves and the habit of the ordinary Sorghum. The spikelets are shorter and broader than in A. Stapfi, and are collected in a dense oblong panicle.

38. A. serratus, Thunb. Fl. Jop. 41; tall, erect, leaves narrowly linear, base narrow, lower branches of subsimple narrow elongate panicles whorled, spikes solitary 2-8-jointed, joints pedicels and callus shortly villous with rufous or purple hairs, sessile spikelets \(\frac{1}{2}\) in ovoid ellipsoid or lanceolate, gl. I rufously hirsute towards the pale tip and sides, IV shortly awned or awnless. Hack. Monogr. Androp. 520; Grah. Cat. Bomb. Pl. 238.

Throughout India, on the hills and plains from the Panjab to Burma, and southward to CEYLON and the NICOBAR ISLDS.—DISTRIB. Asia and Austral trop.

Perennial. Stem 3-4 ft., subsimple, nodes bearded. Leaves 4-20 by \(\frac{1}{2}\) in., setaceously acuminate, glabrous or sparsely hairy on both surfaces, hairs often tubercle-based, midrib broad; sheaths terete below keeled upward, more or less hairy; mouth silkily villous; ligule very short, truncate. Panicle 4-12 in., oblong, rachis glabrous; branches capillary, about equalling the spikes, glabrous or scaberulous, whorls distant. Spikes \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., red-brown; joints and pedicels = \(\frac{1}{2}\) the sessile spikelets, margins shortly villous. Sessile spikelets, callus acute; gl. I coriaceous, dark brown or nearly black, glabrous and polished on the middle dorsally, tips pale; II rather longer, lanceolate, acute, 1-nerved, hairy upwards; III shorter, lanceolate, acute; IV small, oblong, entire or 2-lobed, awned or not. Lodicales ciliate. Pedwelled spikelets narrower than the sessile, paler, hairy; gl. I 7-nerved; III and IV linear, ciliate.—Roxburgh does not seem to have known this grass.

Var. genuinus, Hack.; gl. IV of sessile spikelet 2-lobed, awned in the cleft. A. serratus, Thunb. l. c. (non Rets). A. laxus, Willd. Sp. Pl. iv. 907 (non Rosb.); Steud. Syn. Gram. 391. A. tropicus, Spreng. Syst. Veg. i. 287; Kunth Enum. Pl. i. 503 (non Kunth); Thw. Enum. Pl. Zeyl. 366; Benth. Fl. Hongk. 423. A. dichroauthus, Steud. in Zoll. Syst. Verz. 58. Sorghum fulvum, Heanv. es Roem. & Sch. Syst. ii. 840; Benth. Fl. Austral. vii. 541; Trim. Cat. Ceyl. Pl. 108. S. Junghuhnii, Miq. Fl. Ind. Bat. iii. 783. Holcus fulvus, Br. Prodr. 199.

Var. nitidus, Hack.; gl. IV. of sessile spikelet entire not awned. A. consimilis and pedicellatus, Steud. Syn. Gram. 394. A. fuscus, Prest Rel Hænk. i. 342; Kunth l. c. 502. A. nigrum, Herb. Ham. in Wall. Cat. n. 8777 E. A. nitidus, Kunth Revis. Gram. i. 166, Enum. l. c. 510. Sorghum halepense, Wall. Cat. 8878 E. G.; Wight Cat. n. 2350. S. muticum, Nees in Herb. Wight; Aitohis. Cat. Panjab. Pl. 175; Duthie Grass. N.W. Ind. 23. Chrysopogon fuscus, Trin. en Stoud. Nom. Ed. II. i. 360. Holeus quinqueflorus, Herb. Ham. en Wall. Cat. n. 8778 G.—Andropogon, Wall. Cat. n. 8879.

39. A. purpureo-sericeus, Hochst. ex A. Rich. Tent. Fl. Abyse. ii. 469; annual, robust, upper nodes villous, branches of subsimple panicle vol. vii.

few or many in a whorl flexuous, spikes subsolitary, joints pedicels and callus villous with long white or red brown hairs, sessile spikelets in oblong-ovate, gl. I 5-7-nerved villous all over tip acute, II 2-fid, awn long stout. Hack. Monogr. Androp. 524. Sorghum purpureo-sericeum, Asch. & Schweinf. Beitr. Fl. Æthiop. 310. S. Ritchiei, Munro mss.

The DECOAN; Belgaum, Ritchie. N. Canara, Woodrow. CENTRAL PROVINCES,

Duthie .- DISTRIB. Abyssinia.

Stem 3-4 ft., erect; stout or slender. Leaves 8-10 by 1-1 in., linear, finely acuminate, sparsely hairy, margins hardly scabrid; sheath, ribbed, glabrous or margin fimbriate, mouth villously silky; ligule very short, ciliate. Panicle 4-10 in., erect; rachis glabrous; branches 1-1 in., capillary. Spikes 1-11 in., rarely of 3 joints, sometimes of one sessile and 2 pedicelled spikelets, joints about } the sessile spikelet. Spikelets erect or spreading or pendulous, dorsally flattened; egl. I coriaceous, margins involute from base to apex, keels rounded, villi red-brown or snow-white; II as long as I, acuminate or aristulate, dorsally rounded, coriaceous; III hyaline, epaleatc, 2-nerved, ciliate; IV very fragile, 3-nerved, below the middle ciliate with long hairs; awn 1-14 in., column stout red-brown twisted glabrous; palea minute, ciliate. Pedicelled spikelets usually shorter paler and narrower than the sessile; gl. I thinner, 7-nerved, shortly silky; II and III as in the sessile; IV lanceolate, acuminate, 1-nerved, ciliate, male.—The Indian differs from the African plant in having rather smaller spikelets, in gls. I and II of the sessile not or less scariose at the tip. The pubescence of the spikelet is more copious and pure white in a Deccan specimen from Woodrow, and in a Panjab? one from Stewart. Hackel has named Duthie's specimens A. purpureo-sericeus var. variegatus.

Subgen. VI. Vetiveria, *Hack. Spikes* panicled, branches of panicle many, whorled; joints 3 or more and pedicels linear filiform dorsally convex not channelled, tip truncate. *Sessile spikelets* laterally or dorsally compressed, awned or not; gl. I coriaceous, narrow, margins inflexed or involute, keels muricate; II awned or not; III hyaline; IV entire or 2-fid, awned. *Lodicules* glabrous.

But distinguished from *Chrysopogon* by the absence of a beard of rigid hairs on the tip of the branchlets, seen after the fall of the spike. A. venustus is removed to Amphilophis.

40. A. squarrosus, Linn. f. Suppl. 433; stem stout, leaves long rigid, sheaths strongly compressed, panicle narrow, branches simple strict, spikes many-jointed joints and pedicels glabrous, sessile spikelets linearoblong glabrous, gl. I coriaceous acute dorsally flat, margins broadly inflexed muricate, IV linear-oblong mucronate or shortly awned. Vahl Symb. iii. 9; Hack. Monogr. Androp. 542; Lisboa in Bomb. Journ. Nat. Hist. vi. (1891) 67. A. muricatus, Retz. Obs. iii. 43, v. 21; Kunth Enum. Pl. i. 505, Suppl. 416; Roxb. Fl. Ind. i. 265; Wall. Cat. n. 8759; Grah. Cat. Bomb. Pl. 238; Griff. Notul. iv. 84, Ic. Pl. Asiat. t. 139, f. 57, t. 155, f. 1; Thw. Enum. Pl. Zeyl. 368; Trim. Cat. Ceyl. Pl. 108; Dalz. & Gibs. Bomb. Fl. 302; Duthie Grass. N.W. Ind. 90, Fodd. Grass. N. Ind. 36, t. 24. A. festucoides, Presl Rel. Hænk. i. 340. A. nigritanus, Benth. in Hook. Niger Fl. 573; Steud. l. c. 394. Anatherum muricatum. Beauv. Agrostog. 150, t. 22, f. 10; Spreng. Pugill. ii. 15. Vetiveria odorata, Virey in Journ. Pharmac. Soc. I. xiii. 499. V. arundinacea & muricata, Griseb. Fl. Brit. W. Ind. 559, 560. Mandelorna insignis, Steud. l. c. 359. Agrostis verticillata, Lam. Dict. 59, Ill. Gen. n. 162, Suppl. i. 255. Phalaria zizanioides, Linn. Mant. ii. 183. Holcus ?Viranae, Herb. Ham. ex Wall. l. c.-Virana. Jones in As. Research, iv. 306.

Throughout the Plains and Lower Hills of India, Burma and Crycon,

ascending to 4000 ft. - DISTRIB. Java, Afr. trop.

Stems 2-5 ft., in large, dense tufts with stout spongy aromatic roots, sparingly branched, as thick below as a goose-quill. Leaves 1-2 ft., subbifarious, narrow acute, erect, keeled, glabrous, margins scabrid; sheaths equitant, glabrous; ligule obscure. Panicle 4-12 in., conical, erect, rachis stout and erecto-patent filiform flexuous branches glabrous or scaberulous. Spikes slender, joints and pedicels about = the sessile spikelets. Sessile spikelets grey green yellow or purplish, \(\frac{1}{4}-\frac{1}{4}\) in., slightly curved, glabrous, callus obscurely bearded; gl. I coriaceous, acute, 2-4-nerved; II coriaceous, 1-nerved, margins hyaline, keel muricate; III lanceolate, acuminate, 2-nerved, margins inflexed ciliolate; IV = III ciliate; palea very small, obtuse, glabrous. Pedicelled spikelets like the sessile but gl. I smooth, IV awnless.

—Kbus-khus grass.

41. A. Lawsoni, Hook. f.; stem erect from a stout rootstock, leaves narrowly linear curved acute or obtuse tips serrulate, sheaths compressed, panicle narrow elongate branches erect, spikes pale, joints 6-8 and pedicels slender obliquely truncate, gl. I linear rigid keels muricate dorsally flat scaberulous margins inflexed, II awned keel pectinately ciliate above the middle, IV 2-toothed awned.

Mysore; at Bandypore, alt. 3000 ft., in moist ground, Lawson.

Rootstock horizontal; stems simple, slender, internodes very long. Leaves chiefly subradical, 2-5 by \(\frac{1}{2} \) in, exactly linear, rigid, base not contracted, margins ciliate, nerves 4-8 strong; sheath of lower very short, of cauline very long, striate; ligule a ridge of hairs. Panicle 6-7 in., branches or peduncles of spikes opposite and fascicled, and branchlets slender puberulous with a white scurf. Spikes \(\frac{1}{2} \) in., pale reddish, erect; joints very obliquely truncate, tips obscurely ciliate, and pedicels nearly = spikelet, slender, compressed. Sessile spikelets \(\frac{1}{2} \) in., linear-lanceolate, callus bearded with silky hairs; gl. I coriaceous, tip obtuse, briatly; II cymbiform, tip 2-fid, awn longer than the gl., base ciliate; III oblong, ciliate, nerveless; IV arched, linear, obtusely 2-toothed, awn very slender; palea oblong, ciliate, nerveless. Anthers long. Pedicelled spikelets male, longer and narrower than the sessile, callus naked, gl. I 3-nerved, awned, keels pectinately ciliate; II acuminate, awned; III and IV oblong, obtuse, ciliate.—The tips of the branchlets bearing the spikes have a few short unequal bristles, showing an approach to those of Chrysopogon.

Subgen. VII. Chrysorogon, Hack. Spikes of 3 spikelets, solitary or subsolitary (1-4 in C. Gryllus) on the capillary whorled branches of an erect or inclined panicle; branches with obconic obliquely truncate tips crowned with a ring or beard of stiff hairs. Spikelets 3-nate, a sessile bisexual, and 2 pedicelled males or neuters. Sessile spikelets narrow, laterally compressed; gl. I narrow, linear, rigid, erect, 4-nerved, usually laterally compressed; II broader, laterally compressed, obtusely keeled, 3-nerved, tip 2-lobed awned or not; III hyaline, 2-nerved; IV the narrow hyaline 1-3-nerved base of a long awn. Pedicelled spikelets dorsally compressed; gls. I and II awned or not.—Ligule of minute hairs in all.

The only subgenus with the tips of the branches of the panicle bearded, as best seen after the fall of the spike. The genus has a better claim to be retained than most of Andropogoneæ. The species are, with the exception of the first two, very difficult of definition, and must be regarded as merely provisionally established.

- * Pedicels of the upper spikelets half as long as the sessile spikelet or longer.
 - † Pedicels of the upper spikelets glabrous or nearly so.
 - 42. A. Gryllus, Linn. Cent. Pl. ii. 33; stem simple, panicle large,

branches long capillary spreading simple or branched and bearing 2-4 spikes, sessile spikelets 1 in., gl. I 2-toothed dorsally rounded with 2 muricate or mamillate keels or channels, II mucronate or aristulate keel and sides bristly above the middle. Kunth Enum. Pl. i. 504; Hack. Monogr. Androp. 550; Steud. Syn. Gram. 395; Host Gram. Austr. ii. 1, t. 1; Sibth. Fl. Greec. i. t. 67; Duthie Grass. N.W. Ind. 22, Fodd. Grass. N. Ind. 40. A. echinnlatus, glabratus & Royleanus, Steud. l.c. 395, 397. A. pallidus, Kunth Revis. Gram. i. 165. A. paniculatus, Lam. Fl. Fr. Ed. 2, iii. 633; Ill. Gen. 840, f. 1. Chrysopogon Gryllus, Trin. Fund. Agrost. 188; Nees Gen. Fl. Germ. Monocot, i. t. 93; Benth. Fl. Austral. vii. 537; Aitchis. Cat. Panjab. Pl. 176. C. glabratus, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1833) 318. Rhaphis Gryllus, Desv. Opusc. 69. R. Royleana, Nees en Steud. l. c. 397. R. echinulata. Nees in Royle Illustr. Bot. Himal. 417. Pollinia Gryllus, Spreng. Pugill. ii. 10; Reichb. Ic. Fl. Germ. t. 54. P. pallida, Roem. & Sch. Syst. ii. 829. Apluda Gryllus, Presl Cyp. & Gram. Sic. 55. Holcus Gryllus & pallidus, Br. Prodr. 199 .-Chrysopogon, Wall. Cat. n. 8792 B. C. D.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4-9000 ft. Khasia Hills, alt. 4-5000 ft.—Distrib. Eastwards to S. Europe and N. Africa, Australia.

Stems forming dense hard tufts, erect, 6 in. to 5 ft. high, as thick as a goosequill below; nodes smooth. Leaves 6-18 by \(\frac{1}{2}\)-\frac{1}{2}\) in., linear, acute, glabrous or hirsute, margins serrulate; sheath keeled above, glabrous or pubescent. Paniele 3-8 in.; rachis angular, scabrid, axils bearded; branches 2-4 in., usually very many in a whorl, tips obliquely truncate densely hearded. Sessile spikelets; callus straight, acute; gl. I coriaceous, shining, smooth or scaberulous, margins broadly involute; II chartaceous, lanceolate, hynline, margins ciliate, awn = the spikelet or shorter; III linear-oblong, obtuse, nerveless; IV linear, minutely 2-toothed, awn minute or \(\frac{1}{2}\)-\frac{1}{2}\) in.; palea small, oblong, glabrous. Pedicelled spikelets rather longer than the sessile, terete, lanceolate, acuminate; pedicels glabrous or ciliolate; gl. I acuminate or aristulate, 5-9-nerved, keels ciliate above; II lanceolate, acuminate, ciliate; III and IV narrower, ciliate; awn of IV = \(\frac{1}{2}\) the glume.—Hackel has 5 subspecies, of which 3 are Indian. 1. genuinus; callus about \(\frac{1}{2}\) in. hairs rustybrown, awn of gl. IV 1-1\(\frac{1}{2}\) in. stout. 2. echinulatus, callus hairs pale yellow, awn \(\frac{1}{2}\)-\(\frac{1}{2}\) in. slender. 3. glabratus, awn of gl. II minute.

43. A. aciculatus, Retz. Obs. v. 22; stem creeping and branching below, leaves short, sheaths terete, panicle very narrow, branches strict erect. spikes solitary, sessile spikelets very narrow, callus very long acicular, gl. I linear acute or minutely 2-cuspidate convex margins broadly inflexed smooth below keels scabrid aculeolate above, II acuminate aristulate, keel ciliate above. Roxb. Fl. Ind. i. 262; Grah. Cat. Bomb. Pl. 238; Hack. Monogr. Androp. 562. A. acicularis, Willd. Sp. Pl. iv. 906; Kunth Enum. Pl. i. 505, Suppl. 417. A. javanicus, Steud. Syn. Gram. 396. A. subulatus, Presl Rel. Henk. i. 341. Chrysopogon aciculatus, Trin. Fund. Agrost. 188; Wall. Cat. n. 8780; Wight Cat. n. 1674; Thw. Enum. Pl. Zeyl. 366; Trim. Cat. Coyl. Pl. 108; Duthie Grass. N.W. Ind. 22 (acicularis), Fodd. Grass. N. Ind. 39; Benth. Fl. Hongk. 424, Fl. Austral. vii. 538. Ö. subulatus, Trin. ex Steud. Nomencl. Ed. II. ii. 360; Mig. Fl. Ind. But. iii. 491. C. trivialis, Arn. & Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 171. Rhaphis acicularis, Desv. Opusc. 69. R. javanica, Nees ex Steud. Syn. Gram. 396. R. trivalvis, Lour. Fl. Cochinch. 553; Trin. Sp. Gram. Ic. t. 8, 9. Centrophorum chinense, Trin. Fund. Agrost. 106, t. 5.-Holcus, Griff. Notul. iii. 12, Ic. Pl. Asiat. t. 141, f. 1 (aciculatus).—Rheede Hort. **Mal**. xii. t. 43.

Plains and lewer hills of India, from Kumaon to Sikkim in the Himalaya, the Khasia Hills and southward to the Nicobar Islds, and CEYLON.—DISTRIB, Trop.

Asia, Australia, and Polynesia.

Stem woody leafy and extensively creeping below, then erect, 1-2 ft., slender. Leaves densely tufted, 1-5 by \(\frac{1}{8}\)-\(\frac{1}{6}\) in., flat, obtuse or acute, often undulate, glaucous, glabrous, margins spinulose; sheath terete; ligule a very narrow ciliate membrane. Panicle 1-3 in., pale or purplish; branches capillary, scaberulous or villous below the spikelets, tips obliquely truncate. Sessile spikelets \(\frac{1}{6}\) in.; callus nearly as long as the glumes, acicular, shortly bearded; gl. I chartaceous, obscurely 2-3-nerved or nerveless; II lanceolate, acuminate or aristulate, 1-nerved; III linear-oblong, 2-nerved; IV linear, acuminate; awn \(\frac{1}{6}\)-\(\frac{1}{6}\) in., scabrid; palea small, linear, obtuse, glabrous, nerveless. Pedicelled spikelets purple, much longer and narrower than the sessile; pedicels slender, scaberulous; gl. I subulate-lanceolate, aristulate, 3-nerved, ciliate; III and IV shorter, ciliate; palea minute, cuspidate.

- †† Pedicels of upper spikelets villous with rusty rarely pale hairs.
- § Glume I of pedicelled spikelets long-awned, II not or very shortly awned.
- 44. A. verticillatus, Roxh. Fl. Ind. i. 263; tall, stout, leafy, leaves long very hairy, panicle broad of many whorls of many long simple smooth spreading arching branches terminated by solitary drooping spikelets, sessile spikelets \(\frac{1}{2}\) in., callus rather long glabrous in front, gl. I setulose beneath the tip only strongly compressed above, II glabrous keel ciliate beneath the long awn, awn of IV $1\frac{1}{2}$ in., pedicelled spikelets \(\frac{1}{2}\) in. narrowly lanceolate glabrous 5-nerved keels ciliate at the tip only. Kunth Enum. Pl. i. 506; Hack Monogr. Androp. 555. Chrysopogon verticillatus, Trin. ex Steud. Nom. Ed. II. i. 360.

Mountainous Regions (of the N. Circars probably), Roxburgh.

Root woody, perennial. Stem 4-6 ft., terete, solid towards the base, smooth, as thick as a small goose-quill. Leaves approximate, 18 by 2 in., particularly hairy on the inside towards the base, margins spinulose. Panicle conical, lax, 8-10 in.; branches 2-3 in. Spikes narrow, pale. Sessile spikelets about twice as long as the pedicels; callus to in. long; gl. I 4-nerved, tip hyaline, acute; II narrow, tip 2-fid, awn as long as itself; III oblong, obtuse, margins retrosely ciliate; IV the very narrow 3-nerved hyaline base of the awn, tip obscurely 2-lobed. Pedicelled spikelets pale, shining, pedicels abruptly truncate rather laxly ciliate on the margins and dorsally; gl. I with the 2 lateral nerves nearer the margin, awn longer than itself: II lanceolate, acuminate, ciliate, 3-nerved; III very narrow, ciliate, 2-nerved; IV linear, 1-nerved, 2-fid.—I have seen only a single very slender leafless specimen of what I take to be Roxburgh's plant, bearing the name in Arnott's handwriting on a ticket with Roxburgh's name in that botanist's writing in the corner. The description of the habit, leaves, &c., is taken from Roxburgh. Hackel, who does the same, describes the spikelets from a specimen also named by Arnott, and sent to him from Nees' Herbarium.

45. A. asper, Heyne in Herb. Rottler (asperum); leaves broadly linear acute base cordate midrib beneath spinulose, sheaths broad compressed laxly hirsute, panicle narrow of many whorls of short simple smooth erect branches bearing solitary rarely 2 erect spikes, sessile spikelets \(\frac{1}{2}\) in., callus long villous all round, gl. I hispid beneath the tip strongly compressed above, II keel and sides more or less hispid above the middle, awn of IV $1\frac{1}{2}$ -2 in., pedicelled spikelets \(\frac{1}{2}\) in. narrowly lanceolate 7-nerved keels ciliate.—Chrysopogon asper, Heyne ex Wall. Cat. n. 8784.

- Stem 2-3 ft., leafy below, very slender above. Leaves distichous, 12-18 by 1-1 in., exactly linear, coriaceous, flat, smooth, midrib very slender, 11-nerved, margins spinulosely serrulate, and with a few long tubercle-based cilia towards the broad semi-amplexicaul base, midrib beneath serrulate; lower sheaths 1 in. broad, keeled, armed with scattered tubercle-based hairs. Panicle 7 in., rachis smooth; branches unequal, those of the lowest whorl the longest, about 1 in., usually with only one spike, tips very shortly bearded. Sessile spikelets pale, coriaceous : callus 12-13 in.; awn of II as long as itself or shorter; III shorter than II, narrow, obtuse, 2-nerved, ciliate: IV the linear hyaline 3-nerved base of the awn. Pedicelled spikelets pale, shining, pedicels very shortly rufous-villous on both margins, excised at the tip in a semicircle; gl. I thin, tip 2-toothed, nerves strong subequidistant, or the 3 lateral on each side submarginal, margins narrowly incurved, keels ciliolate from base to tip; II lanceolate, acuminate, 3-nerved, ciliolate; III linear-oblong, 2-nerved, ciliate; IV narrowly lanceolate, 1-nerved.—I have seen only two specimens of this plant, that in Herb. Wallich, and another sent by Heyne to Rottler named A. asperum in his own handwriting. Very closely allied to A. verticillatus, but differing totally in habit and foliage according to Roxburgh's drawing and description of that plant, and coming from a very different part of India.
- 46. A. lancearius, Hook. f.; stem tall leafy, leaves narrowly lanceolate acuminate narrowed towards the base quite glabrous flat smooth midrib beneath quite smooth, sheaths imbricate compressed, panicle narrow of many whorls of short simple smooth erect branches bearing solitary erect spikes, sessile spikelets \(\frac{1}{4}\) in., callus short glabrous in front, gl. I glabrous or minutely ciliate at the strongly compressed tip, II keel and sides above the middle more or less hispid, awn of IV 1\(\frac{1}{4}\) in., pedicelled spikelets \(\frac{1}{3}\) in. narrowly lanceolate 7-nerved keels eciliate except at the tip.

SIKKIM HIMALAYA; at the foot of the hills, Punkabaree, Kurz. CHOTA NAGPORE;

Ramghur, Ghat, 1750 ft., Clarke.

- Stem 2-3 ft. or more, leafy upwards. Leaves 12-14 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., rather thin, narrowed from below the middle to the base, quite smooth on both surfaces, midrib broad white above, nerves many very slender, margins minutely spinulose; sheaths keeled, quite glabrous; ligule a row of very fine short hairs. Panicle 6 in., quite glabrous in front, in the much more hairy gl. II of the sessile spikelet, and in the eciliate keels of gl. I of the pedicelled spikelets.—The Chota Nagpore specimen has been named \(A\) verticillatus by Hackel in a letter to Mr. Clarke, from which it differs in the form of the panicle and glabrous leaves; its gl. IV of the pedicelled spikelets is 2-fid, but that of the Sikkim plant is lanceolate and aristately acuminate. I have examined a specimen of what may prove to be a form of this plant collected at Gya in Behar (Herb. Hort. Calcutt.) in which gls. II and IV of the pedicelled spikelets are both awned, the awn of the latter (IV) being sometimes as fully developed as that of the sessile spikelet! The specimen is in too imperfect a condition to be described fully: the gl. I of the pedicelled spikelet is quite glabrous with a 2-boothed tip. In all other respects it agrees with \(A\) lancearius.
- 47. A. **Hamiltoni**, Hook. f.; tall, stout, leaves very long linear gradually acuminate smooth above scaberulous beneath margins nearly smooth, panicle large ovoid dense of many long smooth erect branches in many closely approximate whorls each bearing 1-3 spikelets, spikes erect, sessile spikelets $\frac{1}{4}$ in., callus very short villous all round, gl. I minutely hispid at the strongly compressed tip, II keel ciliate close under the long awn, awn of gl. IV $2\frac{1}{2}$ in., pedicelled spikelets $\frac{1}{2}$ in. linear-lanceolate, gl. I 7-9-nerved ciliate close to the tip only. Holcus Carar, Ham. in Wall. Cat. n. 8792 A.—Chrysopogon, Wall. Cat. l. c.

BEHAR : Monghir, Hamilton.

Andropogon.

Stem several feet high, stout, terete, leafy, quite smooth. Leaves 1 tf. or more by 1-1 in., flat, rather thin, many-nerved, beneath and midrib quite smooth, base rather contracted; sheath terete, smooth, glabrous; ligule a ridge of minute hairs. Panicle 6 by 21 in., peduncle stout as thick as a duck's quill; rachis stout, terete; branches very unequal, longest 2-3 in., each with usually 2-3 spikes. Sessile spikelets, callus 30 in.; gl. I 4-nerved, polished; II 2-lobed, awn as long as itself, margins not ciliate; III oblong, obtuse, hyaline, 2-nerved; III the linear hyaline 3-nerved eciliate base of the awn. Pedicelled spikelets pale green, pedicels sparsely villous on the margins and back with short rufous hairs, unequal, } and } shorter than the sessile spikelet; gl. I narrowed into an awn often as long as itself, lateral 3 nerves on each side submarginal; II and III lanceolute, acuminate, retrorsely ciliate, II 3-nerved, III 2-nerved.—The specimen in Herb. Wallich consists of a portion of a stem a foot long, a panicle fully eme, zed from a leaf-sheath, with subcrect branches which will probably spread later on, and several leaves. Another in Hamilton's Herbarium (now at Edinburgh) corresponds precisely. It is nearly related to asper, but a very robust tall plant, the branches of the panicle are much more numerous and longer, the leaves glabrous and not spinulosely margined, the spikelets much larger, the callus shorter, and the margins of gl. II of the sessile spikelet eciliate. It may prove to be a form of A. verticillatus.

- §§ Glumes I and II of pedicelled spikelets both awned.
- 48. A. Wightianus, Steud. Syn. Gram. 395; leaves linear acute glabrous or pubescent spinulosely serrulate, lower sheaths compressed, rachis and branches of panicle minutely hairy, sessile spikelets 1 in., callus long densely bearded all round, gl. I laterally compressed above, minutely truncate glabrous below hispid above, II long-awned hispid above on the keel and sides, awn of IV 2-21 in., pedicelled spikelets lanceolate pubescent much longer than the sessile. A. aristulatus, Hochst. ex Steud. Syn. Gram. 397; Hack. Monogr. Androp. 556. A. breviaristatus, Steud. l. c. 396. Chrysopogon Esenbeckii, Wight Cat. n. 1805 (non Steud.). C. Wightianus, Nees ex Steud. l. c.; Wight Cat. n. 1676, Herb. 3398. Rhaphis orientalis, Desv. Opusc. 69. R. Wightianus, Nees ex Steud. l. c.—Chrysopogon. Wall. Cat. n. 8785 C. D.

MADRAS, Wight, Griffith, &c. NILGHIRI HILLS, Schmid, Kuntze. BURMA,

Kuntze (Hackel) .- DISTRIB. Anam.

Variable in habit; stems short or tall, erect or ascending from a short stout creeping stock. Leaves 3-10 in., rigid, from glabrous to pubescent on both surfaces and with sometimes tubercle-based hairs; sheath glabrous; ligule very short, villous. Panicle 3-5 in., contracted, lower branches long, few in a whorl. Spikes solitary, green or brownish. Sessile spikelets subcylindric; callus long, hairs rusty; gl. I obscurely 4-nerved, tip 2-dentate; II chartaceous, tip 2-lobed, awn as long as the gl. or shorter; III linear-oblong, 2-nerved, ciliate; IV awn with a narrowly dilated 2-lobed base, column hispid. Pedicelled spikelets nearly 1 in.; pedicel truncate, margins shortly villous; gl. I glabrous or pubescent, 7-nerved, awn longer than the gl., keels ciliate; II lanceolate, 3-nerved, awn as long as the gl. or shorter; III oblong, 2-nerved, ciliate; IV very narrow, ciliate, nerveless.—I have seen no Ceylon specimen of this species; Thwaites' C.P.n. 3248 in Herb. Kew, is a starved specimen of A. zeylanicus. Nor have I seen Burmese or Anam ones.

49. A. distichopyllus, Hook. f.; stem stout fastigiately branched, leaves distichous erecto-patent narrowly linear rigid smooth, sheaths terete, panicle very long-peduncled narrow, branches very unequal erect smooth with one terminal spike, sessile spikelets 1 in. callus elongate shortly villous all round, gl. I 2-cuspidate quite glabrous, II glabrous, awn of gl. IV 2½ in., pedicelled spikelets longer than the sessile lanceolate, gl. I glabrous 7-nerved keels ciliate at the tip only.

SOUTHERN BURMA; on the coast at Kobok, Kurz.

A perennial, apparently of bushy habit several feet high, branches rigid terete glabrous. Leaves 4-6 by $_{10}^{-1}$ - $\frac{1}{3}$ in., striate, complicate, subpungent, margins smooth, ciliate towards the base; sheath appressed, smooth. Pastels 5-6 in.; peduncle 12 in.; rachis slender, smooth; branches strict, in distant fasciles rather than whorls, tips very oblique with erect beards; lower 1 in. long, rarely with 2 distant spikes. Sessile spikelets very narrow; callus $\frac{1}{3}$ in.; gl. I 4-nerved; II narrow, complicate, 3-nerved, tip 2-lobed, awn as long as itself; III linear-oblong, obtuse, ciliate; IV the very narrow hyaline 3-nerved base of the awn. Pedicelled spikelets nearly $\frac{1}{3}$ in.; pedicels $\frac{1}{3}$ shorter than the sessile spikelet, tip retuse, margins ciliate; gl. II 3-nerved, ciliate, shortly awned; III as in the sessile spikelet; IV 0.—I have seen but one specimen of this very distinct-looking plant.

- §§§ Glums I of pedicelled spikelets not awned, II not or very shortly awned.
- 50. A. zeylanious, Nees ex Steud. Syn. Gram. 397; leaves very long and narrow, panicle ovate-oblong, branches in few whorls spreading with 1-3 terminal spikes, rachis scaberulous, sessile spikelets \(\frac{1}{6} \) in, callus long naked in front, gl. I not laterally compressed above, dorsally with 2 rows of cilia or spipules above the middle tip truncate, awn of gl. IV \(\frac{3}{4} \frac{1}{4} \) in., pedicelled spikelets much longer than the sessile lanceolate 5-nerved glabrous keels eciliate. A. nodulibarbis, Hochst. ex Steud Syn. Gram. 396; Hack. Monogr. Androp. 553. A. peninsulæ, Steud. l. c. Chrysopogon Arnottianus, Nees ex Steud. l. c. 396. C. Wightianus, Thu. Enum. Pl. Zeyl. 366 (C.P. 3248) (exl. var. β); Trim. Cat. Ceyl. Pl. 108 (non Nees). C. zeylanicus, Thw. l.c. (C.P. 996) (non Steud.). Rhaphis zeylanica, Nees ex Steud. l. c.—Chrysopogon, Wall. Cat. n. 8785 A. B.

NILGHIER HILLS, alt. 7-8000 ft., Wight, &c. CEYLON, ascending to 6000 ft., Walker. &c.

- Stems 1-3 ft., tufted, stout or slender. Leaves many from the base of the stem, 12-16 by \$_{10}^{-2} in., flexuous, rather coriaceous, margins more or less laxly ciliate with rather long hairs; lower sheaths short, flattened, keeled; ligule of short hairs. Panicle 5-8 in., contracted or effuse, with long naked unequal lower branches. Spikes green or blueish. Sessile spikelets, callus \$_{10}^{-2}\$ in., hairs yellow or rusty brown; gl. I coriaceous, tip ciliate, often 2-toothed; nerves 2 pairs, obscure; II 3-nerved, tip 2-lobed, keel spinulosely ciliate above the middle; III oblong, obtuse, 2-nerved, retrorsely ciliate; IV the very narrow sub-2-lobed, 3-nerved, eciliate dilatation of the base of the awn. Pedicelled spikelets \(\frac{1}{2} \) in.; pedicels truncate, margins shortly densely or laxly ciliate on one or both margins; gl. I narrowly lanceolate, keels minutely ciliate, nerves subequidistant or the lateral pairs submarginal; II acuminate, 3-nerved, retrorsely ciliate; III oblong, obtuse, 2-nerved, retrorsely ciliate; IV smaller, ovate-lanceolate, 1-3-nerved, ciliate.
 - ** Pedicel of upper spikelets not half as long as the sessile spikelets.
- 51. A. monticola, Schult. Mart. iii. 665; stem erect or ascending usually very slender, leaves very narrow glabrous, lower sheaths compressed, panicles rather short of several whorls of few or many capillary flexuous very unequal branches bearing solitary spikes, sessile spikelets pale, callus short, gl. I compressed glabrous or keel ciliate above the middle, II dorsally more or less ciliate with short or long rigid bristles, awn of IV \(\frac{1}{2}\)-1 in. capillary, pedicelled spikelets lanceolate awned or not 7-nerved, pedicels = \(\frac{1}{2}\)-\(\frac{1}{2}\) the sessile spikelet margins more or less villous.

WESTERN HIMALAYA, from Kashmir to Nepal, ascending to 6000 ft. Hilly

districts, from the PANJAB to BEHAR and southwd, to CRYLON. BURMA, Collett .- DISTRIB. Affghanistan, S. Africa.

Stams tufted, 1-3 ft., simple or branched, usually almost filiform, rarely as thick as a crow-quill or stouter. Leaves 6-18 in., rarely more than 1 in. broad, finely acuminate, quite smooth above and beneath, margins minutely scaberulous; upper sheaths terete, lower more or less compressed, sometimes very much so and membranous. Panicle 2-4 in., rarely more; rachis flexuous; branches in whorls of 3-12, rarely more, smooth or scaberulous, lowest \(\frac{1}{2}\)-1 in. or more, upper shorter; all quite smooth, or in the lower part together with the rachis scaberulous, rarely scaberulous throughout. Spikes very variable in size; the green blue and purplish or brown nedicelled always longer than the pale sessile. Sessile spikelets 1-1 in.; callus hairs short or long, from white to rusty red; gl. I narrow, strongly compressed, margins' membranous, tip rounded; II broader, tip 2-fid, with a short recurved awn, keel obtuse from glabrous to hirsute for a greater or less part of its length, with rigid or flexuous rufous or white bristles, margins membranous hardly ciliate; III hyaline, oblong, obtuse, ciliate; IV the long narrow hyaline 3-nerved eciliate dilatation of the awn. Pedicelled spikelets 1-1 in., neuter or male, from ovate- to linear-lancedate, acuminate; pedicels cuneate, margins sparsely or densely villous, the upper hairs in some of the most densely villous nearly equalling the spikelet from dark rusty red to white; gl. I thin, acute acuminate or awned, the awn equalling or shorter than the gl., glabrous or pubescent; nerves always 7, subequidistant, or 2 on each side sub-carinal; margins narrowly incurved, spinulosely ciliate or smooth; II lanceolate, acuminate, ciliate; III hyaline, oblong, obtuse, 2-nerved or nerveless; IV shorter, narrower, hyaline, 1-3-nerved .-- I am unable to classify the varieties of this common and variable plant in accordance with geographical areas or other considerations. This, if possible, must be effected by field botanists in India. There is every gradation from the coarsely hirsute keel of monticola, to the perfectly smooth of some states of Trinii; from the awnless to long awned gl. I of the pedicelled spikelets, and from the glabrous to the pubescent of the same organ; the colour of which affords no character; nor does its length, or that of the cilia on its keels.

Var. monticola proper; gl. II of sessile spikelet villous for more or less of its length with long flexuous usually rufous rigid bristles. A. monticola, Schultes l.e. Kunth Enum. Pl. i. 506; Steud. Syn. Gram. 395; Hack. Monogr. Andrep. 557 (excl. var. villosus). A. aciculatus, Herb. Wight ex Wall. Cat. n. 8782 B. A. montanus, Koen. in Herb. Banks. A. Sprengelii, Kunth Revis. Gram. 166. Chrysopogon montanus, Trin. in Spreng. N. Entdeck. ii. 93; Trim. Cat. Ceyl. Pl. 108. Pollinia fulva, Spreng. Pugill. ii. 93.—Chrysopogon, Wall. Cat. n. 8782.

Var. Trinii; gl. II of sessile spikelets glabrous or shortly ciliate, hairs of callus and pedicels often very pale reddish or white. A. Trinii, Steud. Syn. Gram. 395; Hack. Monogr. Androp. 558. A. ciliolatus, corrulens, and increscens, Steud. l. c. Chrysopogon ciliolatus, Boiss. Fl. Orient. v. 458 (excl. var. f.); Duthis Grass. N. W. Ind. 22. C. corruleus, Duthie l. c. 23, Fodd. Grass. N. Ind. 39, t. 60. C. increscens, Nees ex Steud. l. c. 396. C. Wightianus, var. leucanthus, Thw. Enum. Pl. Zeyl. 366; Trim. Cat. Ceyl. Pl. 108. C. serrulatus, Trin. is Mem. Acad. Petersb. Ser. VI. ii. (1833) 318, Sp. Gram. Ic. t. 331; Duthie l. c. Rhaphis ciliolata and corrules, Nees ex Steud. l. c. 396, 395.—Chrysopogon, Wall. Cat. n. 8788, 8791.

Var. robustus, stem tall stout 2-4 ft. and upwards, as thick as a goose-quill below, leaves 8-10 by \$\frac{1}{4}\$ in., rather coriaceous, tapering from the base to the tip, scaberulous above, glaucous beneath; upper sheath 4-6 in. loose, terete keeled, panicle 6 in., sessile spikelets \$\frac{1}{4}\$ in. keel of gl. II hispidly ciliate from base to apex, awn of gl. IV 1\$\frac{1}{4}\$ in., pedicelled, spikelets \$\frac{1}{4}\$ in. lanceolate awned, gl. I awned dorsally pubescent, keels ciliate. Ohrysopogon serrulatus, Herb. Strach. \$\frac{1}{4}\$ Winterb, —Central India, Goona (Herb. Hort. Calcutt.) Kumaon, alt. 5500 \$t.\$ Strackey \$\frac{1}{4}\$ Winterbottom.

52. A. Hackelli, Hook. f.; stem tall stout, leaves narrow finely acuminate, panicle oblong, rachis strict, branches smooth crowded in many superposed whorls short very unequal smooth spreading simple each with a solitary spike, sessile spikelets $\frac{1}{6} - \frac{1}{6}$ in. golden yellow, callus very short beard fulvous brown, gl. I obtuse glabrous, II glabrous awned, awn of IV $\frac{3}{4} - 1$ in., pedicelled spikelets rather shorter than the sessile, gl. I oblong acute quite glabrous 5-7-nerved not awned keel eciliate, II shortly awned.—Chrysopogon, Wall. Cat. n. 8783. Wight Herb. n. 1030 (in Herb. Kew).

TRAVANCORE, Wight. NILGHIRI HILLS; Gondaloo Ghat, alt. 4500 ft., Lawson. Stem 4-5 ft., or more, as thick as a goose-quill below, leafy, quite smooth, branching upward, branches erect. Leaves 2-3 ft., by 1-1 in, coriaceous, smooth, pale glaucous green, striate, margins sub-scaberulous; sheath subterete, keeled, smooth, glabrous; ligule a ridge of hairs. Panicle 4-6 in.; branches in 6-10 whorls, 1-3 in. apart, the longest about 1 in. long, rather stiff, tips hardly oblique, beard of spreading rufous hairs. Spikes solitary. Sessile spikelets yellow; gl. I 4-nerved, polished; II subcymbiform, tip 2-lobed, 3-nerved, margins ciliolate, keel rounded and thickened, awn shorter than the gl.; III linear-oblong, obtuse, hyaline, ciliate, nerveless; IV very narrow, 1-3-nerved, hyaline, base and column of awn brown. Pedicelled spikelets pale green; yellow or purplish, male, pedicels = 1 nearly 1 the sessile spikelets truncate, margins densely villous with long rufous bairs, the upper of which = half the spikelets, gl. I thin, nerves subequidistant, or 2-3-nate pairs submarginal margins narrowly incurved; II lanceolate, 3-nerved ciliate; III oblong, 2-nerved, ciliate; IV narrowly lanceolate, 1-nerved ciliate.—A very handsome plant with a bright golden panicle. Wight's n. 1030 (which is not a catalogue number) is referred by Hackel to A. Trinii var. increscens, with the locality Courtallam, taken from Steudel. It differs from the n. 1030 in Herb. Kew in the villous sheaths with tubercle-based hairs, the leaves hairy on both surfaces and panicle branches 4-8, and is no doubt rightly referred to Trinii.

53. A. velutinus, Hook. f.; stem not tall compressed, leaves linear broad flat acuminate puberulous on both surfaces, sheaths strongly compressed keeled, panicle with flexuous rachis and short flexuous scaberulous branches minutely bearded at the truncate tips, sessile spikelets pale, callus very short rufous bearded, gl. I compressed keel ciliolate above the middle, keel of II hirsute, awn of IV 1 in., pedicelled spikelets oblong truncate strongly 7-nerved not awned keels ciliate dorsally glabrous or hirsute, pedicels very short. Chrysopogon velutinus, Arnott in Herb. Wight n. 2314.

MYSORE; at Cuddapah, Wight.

Stems 18 in. high, rather stout, soft, tufted, leafy from the base. Leaves 6-10 by \$\frac{1}{2}\$ in., distichous, flaccid, 5-9-nerved, slender midrib beneath and margins spinulosely ciliolate and with a few long hairs at the base; lower sheaths equitant, \$\frac{1}{2}\$ in. broad, strongly compressed and keeled, keel spinulosely ciliate, upper sheaths finely pubescent. Panicle (imperfect) 2\frac{1}{2}\$ in., branches \$\frac{1}{2}\$-1 in. Sessile spikelets \$\frac{1}{2}\$ in., pale yellow; gl. I with minutely ciliolate margins; II margins eciliate, gls. III and IV in both sessile and pedicelled spikelets as in A. monticola.—

I have seen only one specimen of this plant which differs widely in habit and foliage from any form of A. monticola, in the broad flat flaccid pubescent leaves and sheaths. It is a native of a botanically unexplored district.

54. A. polyphyllus, Hack. mss. in Herb. Duthis; stem simple or fastigiately brauched quite glabrous, leaves many long narrow rigid acuminate flat pale glaucous-green glabrous coriaceous, sheaths terete,

panicle oblong subsecund dense-fid. very pale, branches many short in many closely approximate whorls smooth, sessile spikelets $\frac{1}{6}$ in., callus long obtuse bearded at the very base only with long fulvous hairs, gl. I obtuse glabrous, keel ciliate towards the tip, II not awned keel glabrous or ciliate, awn of IV $\frac{1}{8}$ in. nearly straight pale, pedicelled spikelets narrowly lanceolate acuminate glabrous 7-nerved eciliate not awned, pedicels naked villous at the tip only. A. Aucheri, var. polyphyllus, Hack. in Herb. Duthie.

CENTEAL PROVINCES; Khandus, Chanda, and Jubbulpore districts, by the Nerbudda and Indravati rivers. &c., Duthie.

Stem 2-3 ft.; stiff, as thick as a crow-quill or more. Leaves crowded, or not, 6-10 by $\frac{1}{12} - \frac{1}{6}$ in., pale glaucous-green and smooth on both surfaces, midrib and nerves very slender, margins minutely scaberulous; sheaths appressed, hard. Panicle 4-5 in.; branches $\frac{1}{4} - \frac{1}{2}$ in., very unequal; peduncle slender, quite glabrous. Spikes dropping, white or pale purplish. Glumes as in A. monticola. Pedicelled spikelets rather longer than the sessile; pedicels = about $\frac{1}{4}$? the sessile spikelets. Habit, foliage and secund panicle very unlike A. monticola, and remarkable for the stout naked callus about $\frac{1}{16}$ in. long with a long-bearded base, and the naked pedicels villous at the tip only with erect fulvous hairs half as long as the spikelets. It differs from Aucheri, in the tall habit, long-glabrous glaucous foliage, glabrous peduncle and branches of the panicle, callus, pedicels, awnless pedicelled spikelets, and the very short awn of gl. IV of the sessile spikelet.

55. A. Aucheri, Boiss. Diagn. Ser. I. v. 7; densely tufted, basal sheaths silky, leaves short linear pubescent, sheaths terete very pale silky peduncle pubescent below the oblong panicle, branches in approximate whorls short very unequal scaberulous, sessile spikelets \(\frac{1}{6}\)-\(\frac{1}{6}\) in callus long villous all over with long pale silky hairs, gl. I glabrous or keel and tip ciliate, keel of II hirsute, awn of IV \(\frac{3}{6}\)-l in pale, pedicelled spikelets longer than the sessile narrowly lanceolate 5-7-nerved, keels ciliate and with a long ciliate awn, pedicels = \(\frac{1}{3}\) the sessile spikelet silkily villous. A. Aucheri, a. genuinus, Hack Monogr. Androp. 560. Chrysopogon ciliolatus β. Aucheri, Boiss. Fl. Orient. v. 458.

SCIND; near Kurrachee, Stocks .- DISTRIB. Affghanistan, N. Africa.

Stem 6-18 in., simple or sparingly branched, buse thickened, leafy. Leaves 2-4 by \(\frac{1}{10-\frac{1}{6}} \) in., sometimes undulate, acute or acuminate, pale green, often ciliate towards the base, margins scaberulous; sheath very pale. Panicle 2-3 in., erect, long-peduncled, rachis scabrid. Spikes usually crowded, rarely binate on a branch. Sessile spikelets; callus obtuse; gl. I compressed, with sometimes long terminal bristles; II awned or not, awn hirsutely ciliate; III and IV as in A. monticola. Pedicelled spikelets \(\frac{1}{2} \) in., pedicels silkily villous from base to apex; gl. I sparsely ciliate dorsally, and with very long cilia on the keels towards the tip, awn pale hirsute.—I have confined the description to the Scind plants. Hackel describes the species, which extends to Persia, Arabia, Morocco, and S. Africa as extraordinarily variable, no two specimens agreeing in sll points, and the spikelets varying in the same specimen. These remarks would probably apply to all the allied species of Chysopogon, in whose stability I have no confidence.

Subgen. IX. DICHANTHIUM, Hack. Spikes digitate, rarely solitary or panicled, subsessile or stipitate on the peduncle, joints many and pedicels linear filiform dorsally flat compressed; lower 1-4 pairs of spikelets homogamous (except sometimes in A. annulatus) male or neuter. Sessile spikelets dorsally compressed; gl. I with the margins usually inflexed and

keeled above and involute or not below; II keeled, awnless; III hyaline; IV a naked awn, its base rarely narrowly hyaline, or 2-fid and awned in the cleft. Pedicelled spikelets like the sessile, but male or neuter, awnless.

- Glume IV of sessile spikelets a simple awn, acute at the base.
- 56. A. caricosus, Linn. Sp. Pl. Ed. ii. 1480 (excl. Syn. Rumph.): stem erect or decumbent below, leaves narrowly linear, sheaths compressed, spikes 1-4 in. solitary binate or subdigitately panicled, spikelets closely subdistichously imbricate, joints and pedicels \$\frac{3}{2}\$ shorter than the sessile spikelets \$\frac{1}{2} \frac{1}{2}\$ in., gl. I of sessile spikelets obovate or oblong tip truncate denticulate dorsally more or less villous, keels with ciliate wings, II obtuse 3-nerved, III ovate-oblong ciliate. Hack. Monogr. Androp. 756.

Plains and low hills of India, from Scind to Burma and the Andaman Islds. (not in N.W. India) and southwd. to CEYLON.—DISTRIB, Mauritius, China.

Stem 1-2 ft., erect or ascending from a creeping base, often much branched, stout or slender, even capillary, grooved on one side, leafy; nodes bearded or not. Leaves 6-8 by \(\frac{1}{10} \) \(\frac{1}{2} \) in., finely acuminate, glabrous or ciliate, margins scabrous, sheaths smooth; ligule membranous. Spikes inclined, often flexuous, \(\frac{1}{2} \) \(\frac{1}{2} \) in. broad, silvery, lower sometimes stipitate; joints and pedicels = \(\frac{1}{2} \) the spikelet, ciliate on one margin; callus short, broad. Sessile spikelets 5-7-nerved, margins gl. I broadly incurved below, narrowly above; II narrow, 3-nerved, apiculate, margins ciliate, keel scaberulous; III ovate-oblong, hyaline, nerveless; IV awn \(\frac{1}{2} - \) in., column scabrid. Pedicelled spikelets smaller than the sessile; gl. I broadly oblong, silkily ciliate; II ovate-lanceolate, acute, ciliate.—A very variable grass, of which there are two principal forms.

Var. genninus, Hack.; stem glabrous below the usually solitary spike, gl. I amouth above hairy towards the base. A. caricosus, Linn.; Trim. Cat. Ceyl. Pl. 108. A. binatus & tenellus, Rowb. Fl. Ind. i. 254, 255; Steud. Syn. Gram. 372, 371. A. filiformis, Pers. Syn. i. 103. A. serratus, Retz. Obs. v. 21; Trin. Sp. Gram. Ic. t. 329; Rowb. Fl. Ind. 253; Steud. l. c. 366. Lepecoercis serrata, Trin. Fundam. Agrost. 203; Wight Cat n. 1687, Herb. Prop. n. 1687. Heteropogon

concinnus, Thw. Enum. Pl. Zeyl. 368.

Var. mollicomus, Hack.; stem pubescent below the spikes, gl. I 3-toothed dorsally hairy all over. A. australis, Poir. Encycl. Suppl. i. 585. A. barbatus & pertusus, Herb. Ham. ex Wall. Cat. n. 8809 B. C. A. curvatus, Herb. Russ. ex Wall. Cat. n. 8809 A. A. incurvatus, Kan. ex Trin. in Spreng. Enddeck. ii. 91. A. Konigii, Steud. Syn. Gram. 381. A. mollicomus, Kunth Revis. Gram. i. 365, Enum. Pl. i. 497. Lepeccercis digitatus, Royle Ill. Bot. Himal. 416. Dichanthium nodosum, Usteri Annal. xviii. (1796) 11. Diplasanthera lanosum, Desv. Opusc. 67, t. 5, f. 1.—Andropogon, Wall. (at. n. 8809, 8810 F. H. Wight Cat. n. 1687.

57. A. annulatus, Forsk. Fl. Æg. Arab. 173; densely tufted, leaves narrowly linear, sheaths terete, spikes subdigitately fascicled, peduncles glabrous, joints and pedicels slender laxly ciliate, sessile spikelets & in., gl. I oblong obtuse or truncate flat or convex 5-9-nerved keels ciliate above not winged glabrous or more or less villous with long spreading hairs, II acute, keel smooth except below, III oblong obtuse glabrous. Del. Fl. Egypt. iii. t. 7, f. 2; Kunth Enum. Pl. i. 498 (excl. Syn.); Steud. Syn. Gram. 380; Hack. Monogr. Androp. 570; Wight Cat. n. 1697; Aitchis. Cat. Panjab. Pl. 175; Duthie Fodd. Grass. N. Ind. 33, t. 20; Benth. Fl. Austral. vii. 531; Boiss. Fl. Orient. v. 463. A. Bladhii, Retz. Obs. ii. 27; Kunth l. c. 498; Trin. Sp. Gram. Ic. t. 325; Roxb. Fl. Ind. i. 259; Wight Cat. n. 1698; Aitchis. l. c.; Duthie Grass. N.W. Ind. 19. A. comosus, Link Enum. Hort. Berol. i. 239. A. garipensis, Steud. l. c. 379. A. Ischæmum, Roxb. cx Wight Cat. n. 1697. A. obtusus, Ness

in Hook. & Arn. Bot. Beech. Voy. 243 (excl. Syn. Roxb.). A. scandens, Roxb. l. c. 258; Kunth l. c. 498; Grah. Cat. Bomb. Pl. 238; Dalz. & Gibs. Bomb. Fl. 301; Duthie l. c. 21. Lepeocercis annulata, Nece Fl. Afr. Austr. 98.—Andropogon, Wall. Cat. n. 8810 C. E. G.

Throughout the hills and plains of INDIA, from Kashmir westward to Bengal and

southward (not in Ceylon).—DISTRIB. Trop. Africa, China, Australia, Pacific.

Stems usually woody at the base with strong wiry roots and tufted leaves, then geniculately ascending, 6-36 in.; nodes bearded or not. Leaves 3-12 in., rigid, glaucous, glabrous or hairy above with tubercle-based hairs, margins scabrid; sheath bearded at the tip; ligule oblong, obtuse. Spikes 1-2\frac{1}{2} in., straight or flexuous, usually inclined, pinkish or nearly white, joints and pedicels = \frac{1}{2} the spikelets, slender, rigid, margins shortly ciliate. Spikelets very variable in size, closely imbricating; callus shortly hearded; gl. I thin, nerves strong or faint, not reaching the tip; II lanceolate, 3-nerved, glabrous or ciliolate; III narrow, glabrous; IV awn \frac{1}{2}-1 in., column scabrid. Pedicelled spikelets about = the sessile; gl. I obtuse or acute, 7-11-nerved, keels bristly; II narrower, 3-nerved; III ciliate; IV minute or 0.—
A very common Indian grass, of which Hackel distinguishes three Indian varieties, to which I have added a fourth:—

Var. genuinus; spikes 3-10, gl. I of sessile spikelets beset with rigid tubercle-

based hairs, of pedicelled dorsally hairy all over.

Var. decalvatus; gl. I of sessile spikelets glabrous, of pedicelled often papillose. Var. Bladhii; spikes many, lower long-stipitate, gl. I of sessile spikelets glabrous

or loosely hairy.

Var. papillosus; spikes 3-8 decurved, gl. I of sessile spikelets with a transverse row of tubercle-based hairs below the tip. A. papillosus, Hochst. es A. Rich. Tent. Fl. Abyss. ii. 457; Hack. l. c. 573.—Behar on Parusnath, Clarks.—Afr. trop.

58. A. Clarkei, Hack. in Œsterr. Bot. Zeitschr. xli. (1891) 49; annual, very slender, much branched, leaves 2-4 in. linear-lanceolate, spikes solitary on capillary peduncles from spathiform sheaths, joints and pedicels slender silkily villous sulcate, spikelets subdistichous, sessile silkily villous with white hairs, gl. I elliptic-oblong flat truncate 2-toothed, keels scaberulous, IV a simple awn, gl. I of pedicelled spikelets rather larger narrower red-brown glabrous.

BEHAE; on Parusnath, alt. 4200 ft., Clarke.

Stems 12-18 in., leafy, nodes bearded. Leaves flat, finely acaminate, base contracted, quite smooth, nerves very slender; sheaths long, alightly tunid, mouth contracted; ligule of hairs. Spikes \(\frac{1}{2}\)-1 in. long, flattened, joints and pedicels sulcate, slender. Spikelets 6-8 pairs; two lowest pairs neuter. Sessile spikelets \(\frac{1}{2}\) in.; callus very short; gl. I thinly chartaceous, 7-nerved, margins narrowly inflexed; II narrowly cymbiform, acuminate, 8-nerved, margins ciliate; III oblong, obtuse, hyaline, ciliate; IV the slender awn \(\frac{1}{2}\)-1 in. long. Pedicelled spikelets \(\frac{1}{2}\) in., dark brown; gl. I obtuse or emarginate, many-nerved; II 8-nerved; III smaller.—The white sessile and dark pedicelled spikelets are a marked feature.

59. A. armatus, Hook. f.; annual, tufted, erect, leaves linear copiously hairy, spikes 2-5 subdigitate long peduncied, joints and pedicels slender not grooved, spikelets 10-20 pairs, gl I of sessile oblong obtuse sometimes alveolate dorsally densely silky below the middle keels ciliate, IV a simple awn, gl. I of pedicelled spikelet armed with spreading submarginal tubercle-based bristles twice or thrice its own length.

The CONCAN, Stocks.

Stems 12-18 in., as thick as a sparrow's quill, simple or branched above; nodes bearded. Leaves 4-6 by \(\frac{1}{2}\) \(\frac{1}{2}\) in., flaccid, nerves slender, base rather contracted, softly hairy on both surfaces and with long tubercle-based bristles at the base;

sheaths lax, upper smooth pale spathiform; ligule 0. Spikes \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., flexuous, nodding or cernuous silvery-green, lowest pairs of spikelets male; peduncles \(\frac{1}{2}\)-\(\frac{1}{2}\) in., capillary, axils with whorls of long white hairs; rachis and pedicels slender, terete, silkily ciliate, upper hairs long. Sessile spikelets \(\frac{1}{8}\) in.; callus very short, silkily beurded; gl. I thin, pale, nerveless, with often a large deep dorsal pit, margins narrowly incurved; II acute, nerveless, dorsally silkily villous; III oblong or linear, flat, hyaline, obtuse, nerveless; IV, awn about 1 in., slender, nearly smooth, base acute. Pedicelled spikelets \(\frac{1}{2}\) in. rather narrower than the sessile; gl. I slightly convex, quite smooth between the bristles, keels ciliate, many-nerved; II ovate-oblong, 3-nerved, ciliate; III oblong, obtuse, eciliate; IV very narrow.

60. A. mucronatus, Anderss. ex Hack. Monogr. Androp. 577; stem tall stout, internodes alternately flattened, sheaths terete, leaves linear-lanceolate acuminate pubescent, spikes 5-10 flabellately panicled, sessile spikelets; in. twice as long as the joints and ciliate pedicels, callus hairs half as long as the glumes, gl. I coriaceous obovate-lanceolate obtuse glabrous shining 6-nerved pitted in the middle, keels setose above the middle, II as long lanceolate acute glabrous except the ciliate margin 3-nerved, IV a stout awn, gl. IV of pedicelled spikelets awned or mucronate.

INDIA? Hugel.

Stem 3-4 ft. or taller, simple, nodes 4, bearded. Leaves flat, base fimbriate; sheaths smooth; ligule rounded, ciliolate. Spikes solitary or opposite, shortly peduncled, lower pair of spikelets male. Spikelets yellow-green; gl. I not hyaline at the tip; II obscurely keeled, dorsally shining; III linear-laneeolate, nerveless, ciliate; IV awn ½ in. long, stout; palea minute. Pedicelled spikelets rather longer and broader than the sessile; gl. I obliquely elliptic-oblong, violet-colrd., keels setosely ciliate nearly to the base, 13-nerved; II narrower, lanceolate, acute, 5-nerved, ciliate; III obovate-oblong, 1-nerved, ciliate; IV as long, linear, 1-nerved, glabrous.—Description from Hackel, who says it is a peculiar species, not allied to the preceding, but rather to A. polyptychus.

- ** Gl. IV of sessile spikelet 2-fid, awned in the cleft.
- 61. A. polyptychus, Steud. Syn. Gram. 380; stem slender erect simple or branched below only, leaves erect strict softly hairy acuminate, sheaths subcompressed, spikes 4-6 digitate simple or forked, joints and ciliate pedicels half as long as the sessile spikelets, gl. I of sessile spikelets narrowly elliptic-obloug obtuse 4-7-nerved nearly flat glabrous, margins narrowly incurved, keels strongly ciliate above, II as long mucronate 3-nerved ciliate, IV very narrow with 2 setaceous or lanceolate lobes. Thwaites Enum. Pl. Zeyl 367; Trim. Cat. Ceyl. Pl. 108; Hack. Monogr. Androp. 578.

CEYLON; at Pedrotallagalla, alt. 7000 ft., Thwaites.

Stems densely tufted, 2-3 ft., as thick as a crow-quill below, smooth. Leaves 8-16 in. by \(\frac{1}{10} \) \(\frac{1}{2} \) in., rigid, erect; ligule short, rigid. Spikes usually 8, very fragile, 2 in. long, shortly peduncled, joints and pedicels not furrowed; axils hairy; spikelets closely imbricate, lowest pair male or neuter. Sessile spikelets \(\frac{1}{2} \) in., callus very short, shortly bearded; gl. I not winged, sometimes depressed on the median line; II 3-nerved, glabrous except the margins, acute or aristulate; III oblong-lanceolate, acute, 1-nerved; IV rather shorter, nearly glabrous, awn \(\frac{1}{2} \) in. very slender; palea minute, broadly ovate, ciliate. Pedicelled spikelets broader than the sessile; gl. I convex, many-nerved, narrowly winged on one side, tip membranous, keels ciliate; III oblong, acute, 1-nerved, ciliate; III and IV small, oblong, obtuse, 1-nerved, shortly ciliate.

- 62. A. nitidulus, Hook. f.; annual, very slender, branched, leafy, leaves long narrow flaccid scaberulous base contracted, spikes very few very unequal on a long capillary peduncle white, rachis tenacious, sessile spikelets ovate-oblong 9-nerved dorsally flat glabrous or scabrid towards the hyaline truncate tip, keels ciliate towards the tip, II 5-7-nerved acuminate, IV short broadly 2-lobed, awn very slender.
- N.W. HIMALAYA; on the Sewalik Hills; and Chanda in the CENTRAL PROVINCES, Duthie.
- Steins 3-4 ft., loosely tufted, very slender from the naked base upwards, nodes glabrous. Leaves 8-12 by \$-\frac{1}{2}\$ in., acuminate, thin, margins scaberulous ciliate towards the base, midrib slender smooth, nerves very slender; sheath smooth; ligule oblong, membranous, ciliate. Spikes quite white, the terminal on the peduncle 1-\frac{1}{2}\) in., lower rather distant, sessile, much shorter; peduncle 4-8 in.; joints and pedicels = about \frac{3}{2}\$ the sessile spikelet, very slender, ciliate with long white silky hairs, tips truncate, joints terete, pedicels flattened (almost as in Sect. Amphilophis). Spikelets few, in rather distant pairs, homogamous pairs one or two. Sessile spikelets \frac{1}{2}\) in., callus very short, stellately bearded with white hairs; gl. I thin, greenish, dorsally polished, margins narrowly incurved; II chartaceous lanceolate, 5-7-nerved, margins broadly incurved, ciliate; III smaller, lanceolate, 2-nerved, ciliate; lobes of IV ovate, acute, divergent, ciliate; awn about \frac{1}{2}\) in., slender, column quite smooth. Anthers short. Pedicelled spikelets rather longer than the sessile, narrowly lanceolate, green, neuter; gl. I membranous, 9-nerved, glabrous, margins incurved, ciliate towards the tip only; II 7-nerved; III radimentary or 0.
- Subgen. X. Heterorogon, Hack. Spikes solitary, joints many and pedicels not channelled; lowest pairs or 2-8 pairs of spikelets closely imbricate, male or neuter. Sessile spikelets subcylindric, gl. I subcylindric or oblong, II obtusely keeled, not awned; III hyaline; IV a long awn with a stout column and often a hyaline base. Pedicelled spikelets very unlike the sessile and concealing them.
- * Ligule membranous; column of awn hirsute; callus of sessile fem. spikelets pungent.
- 63. A. contortus, Linn. Sp. Pl. 1045; leaves scabrid above, ligule truncate ciliolate, spikes 1\frac{1}{2}-3 in., sessile fem. spikelets \frac{1}{2} in., callus long rufous-bearded, gl. I dorsally flat, margins smooth involute, awn 3-5 in., pedicelled spikelets \frac{1}{2}-\frac{1}{2} in., gl. I obliquely lanceolate obtuse. Lamk. Encyc. t. 840; All. Fl. Pedem. 260, t. 91; Kunth Enum. Pl. i. 486; Steud. Syn. Gram. 367; Hack. Monogr. Androp. 585 (excl. A. polystachyus, Roxb.; Roxb. Fl. Ind. i. 253; Grah. Cat. Bomb. Pl. 238; Dalz. & Gibs. Bomb Fl. 300; Wall. Cat. n. 8800; Wight Cat. n. 1688, 2321, in part; Baker Fl. Maurit. 444. A. Allionii, DC. Fl. Franc. iii. 97. A. messanensis, Biv. Pl. ined. 5. A. Bellardi, Bub. in Nuov. Giorn. Bot. Ital. (v. 1873) 317. A. besukiensis, Steud. l. c. 307. Heteropogon Allionii, Roem. & Sch. Syst. ii. 835; T. Nees, Gen. Fl. Germ. Monocot. i. 94; Reichb. Ic. Fl. Germ. t. 53. H. contortus, Beauv. ex Roem. & Sch. l. c. 836; Benth. Fl. Austral. vii. 517; Aitchis. Cat. Panjub. Pl. 176; Duthie Grass. N. W. Ind. 19, Fodd. Grass. N. Ind. 32, t. 19. H. firmus, Presl. Rel. Hænk. i. 334. H. glaber, Pers. Syn. ii. 533; Beauv. Agrost. 24, t. 23, f. 8. H. hirtus, Pers. l. c.; Thw. Enum. Pl. Zeyl. 368; Trim. Cat. Ceyl. Pl. 107; Benth. Fl. Hongk. 424. H. hirsutus, Beauv. Agrost. 134. H. hispidissimus, Steud. Syn. Gram. 367. H Hohenackeri, Hochst. ex Miq. Anal. Bot. Ind. ii. 24. H. messanensis, Guss. Fl. Sic. Syn. i. 164. H. polystachyus, Nees Agrost. Bras.

364; Wight Cat. n. 2321 (non Roxb.). H. Roxburghii, Arn. ex Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 183.

Throughout India. Buena, and Ceylon to the Straits of Malacca, ascending the Himalaya to 5000 ft.—DISTRIB. Mediterranean region and tropics generally.

Stems 1-5 ft., erect or decumbent below, densely tufted, simple or fastigiately branched, compressed towards the base. Leaves 6-18 in., narrow, glabrous or hairy especially near the base, rather glaucous, rigid, margins and upper surfaces scabrid; sheaths compressed, keeled. Spikes with the lower 2-6 pairs of spikelets male with coherent joints; joints of upper (fem.) portion very short and curved callus bearded with brown hairs. Sessile (fem.) spikelets 1 in.; gl. I coriaceous, glabrous or hispid, many-nerved, tip membranous; II coriaceous, 8-nerved; III oblong, hyaline, embracing the long slender ovary, tip ciliate : IV awn stout, column hirsute. Pedicelled spikelets 1-1 in.; pedicel very short; gl. I lauceolate, obliquely twisted, herbacsous, keels margined or unequally winged; II membranous, acute, 3-nerved, ciliate; palea minute, ciliate. Sessile spikelets of the homogamous pairs, like the pedicelled, more or less covered with tubercle-based hairs.—Hackel has 2 varieties and 5 subvarieties (excluding polystachyus) of this widely distributed plant, founded chiefly on the number and position of the tubercle-based bristles of the male spikelet. They appear to me to be too inconstant for definition.

64. A. melanocarpus, Ell. Sketch. Bot. S. Carolin., &c., i. 146; tall, stout; leaves scabrid above, sheaths of upper with scrobiculate keels and often nerves, ligule rounded glabrous, spikes \(\frac{1}{2}-1\) in., sessile fem. spikelets in terete hiraute, callus long rufous bearded, gl. I dorsally flat, awn 2-4 in., pedicelled spikelets i-l in costa scrobiculate. A. polystichus, Hochst. ex Steud. Syn. Gram. 369. A. polystictus, Hochst. in Schimp. Pl. Abyss. n. 2012. A. scrobiculatus, Kunth Enum. Pl. i. 507. A. segmnsis, Steud. l. c. 367 (excl. cit. Wall.) Heteropogon acuminatus, Trin. in Mem. Acad. Petersb. Ser. VI. ii. (1883) 254. H. melanocarpus, Benth. in Journ, Linn. Soc, xix, (1881) 71; Duthie Grass, N.W. Ind. 19. H. polystictus, Hochst. in Flora, xxxix. (1856) 28. H. Roylei, Nees ex Steud. l. c. 367. H. scrobiculatus, Fourn. ex Hack. in Mart. Fl. Bras. ii. III. 268.

UPPER GANGETIC PLAIN, Royle, &c. KUMAON, up to 5000 ft .- DISTRIB.

Trop. and subtrop. Afric. and Amer.

Stem 4-6 ft., as thick as a swan's quill below, fastigiately branched above. Leaves 1-2 ft. by 1-1 in , setaceously acuminate, rigid, green, margins scaberulous, glabrous or with long hairs at the base; sheaths compressed, glabrous, upper spathsform, flattened. Spikes green, peduncle stout, in a narrow spathe 3-5 in. long, lower 1-3 pairs of spikelets male or neuter with coherent glabrous joints, upper pairs with fragile bearded joints. Sessile (fem. or bisexual) spikelets 1-1 in., callus long bearded; gl. I obscurely 9-nerved, not furrowed dorsally, margins smooth involute: II coriaceous, linear-oblong 3-nerved, keel hispid; III shorter, oblong, nerveless; IV awn stout, column hirsute. Pedicelled spikelets 1-3 in., obliquely lanceolate, acuminate, pedicel very short; gl. I many-nerved, glubrous, keels ciliate-serrulate; II lanceolate, acute; III much shorter, nerveless, ciliate; IV minute, linear. Sessile spikelets of homogamons pair like the pedicelled.

65. A. triticeus, Br. Prodr. 201; tall, stout, leaves sparsely hairy, sheaths of upper smooth, ligule very short, spikes 3-6 in., sessile fem. spikelets & in. terete, callus long rufous bearded, gl. I dorsally deeply channelled silkily pubescent, awn 3-6 in., pedicelled spikelets 3-1 in. smooth. Hack. Monogr. Androp. 588; Steud. Syn. Gram. 368. A. ischynanthus & liananthus, Steud. l. c. 367. Heteropogon insignis, Thw. Enum. Pl. Zeyl. 437; Trim. Cat. Ceyl. Pl. 107; Benth. Fl. Austral. vii. 517.—Andropogon, Wall. Cat. n. 8801.

The CONCAN, Stocks, Woodrow. CENTBAL PROVINCES; Khandwa, Duthie. BURMA, at Segaen, Wallich. CEYLON; Mateke East, Thwaites.—Distrib. Malaya, Australia.

Stem 6-10 ft., as thick as a swan's quill below, hard, smooth, leafy. Leaves 1-2 ft., narrowly linear, acuminate, glaucous, above and margins scabrid; sheaths compressed, keeled, smooth; ligule ciliate. Spikes \(\frac{1}{2}\)-\frac{1}{2}\]in., very stout, green; lower 12-15 pairs of spikelets homogamous, male or neuter, joints very short. Sessite spikelets \(\frac{1}{2}\) in., cylindric, obtuse, callus long-bearded with rufous silky hairs; gl. I truncate; II obtuse; III glabrous; IV awn hirsute, very stout. Pedicelled spikelets \(\frac{1}{2}\) in., green, pedicel very short; gl. I more or less twisted, lanceolate, many-nerved, one keel winged; II linear-lanceolate, margins ciliate; III and IV hyaline, short, glabrous. Sessite spikelets of the homogamous pair like the pedicelled.

- *** Ligule of hairs; column of awn usually bearded; callus long.
- 66. A. bellariensis, Hack. in Flora (1885) 123; stem tall sheathed to the top, leaves very narrow, sheaths terete, ligule of 2 rows of hairs, spikes $2-2\frac{1}{3}$ in. slender partially sheathed, sessile fem. spikelets $\frac{1}{4}$ in., callus acute bearded with white hairs, gl. I linear-oblong dorsally channelled 6-nerved glabrous, awn $1-1\frac{1}{3}$ in. base dilated and 2-toothed, pedicelled spikelets $\frac{1}{3}$ in. glabrous. Heteropogon polystachyon, Arn. in Wight Cat. n. 2821.

The DECCAN; near Bellary, Wight (Cat. n. 2321 in part).

- Stem 2 ft., ascending, branched above, terete, glabrous. Leaves 6 in. or more, by 1-18 in., rigid, green, quite smooth, puberulous above, setaceously acuminate; sheath glabrous. Spikes 2-3 in., slender, green, joints and pedicels shortly ciliate, lower 2-4 pairs of spikelets homogamous, male. Sessile fem. spikelets pale, callus straight pungent; gl. I chartaceous, glabrous, 6-nerved margins narrowly inflexed, keels scabrid, tip entire hynline; II oblong-lanceolate, obtuse, 5-nerved, margins inflexed; III linear, nerveless, glabrous; IV awn stout, column ciliate with white hairs. Pedicelled spikelets; in., lanceolate, shortly pedicelled; gl. I lanceolate, 7-nerved, glabrous; II uarrower, 5-nerved, ciliate; III and IV very narrow, glabrous. Sessile spikelet of homogamous pair like the pedicelled.
- 67. **A. Bitchiei,** Hook. f.; leaves scabrid, ligule a row of stiff bristles connate below, spikes $\frac{1}{2}-1$ in. green, hispid, sessile fem. spikelets $\frac{1}{2}$ in., callus short hirsute, gl. I oblong, terete rufous villous dorsally not channelled, nerves obscure, IV awn $\frac{1}{2}-2$ in. scabrid base acute, pedicelled spikelets $\frac{1}{2}-\frac{1}{2}$ in. very shortly pedicelled green, gl. I narrowly lanceolate acuminate many-nerved and with a marginal series of long spreading golden tuberclebased bristles.

The DECCAN; Belgaum, Ritchie.

- Stem 4-6 ft. (one only seen). Leaves 1 ft. by \(\frac{1}{2} \) in., coriaceous, linear from a narrow base, acuminate, flat, rigid, shortly hairy on both surfaces hairs fine tubercle-based, margins spinulosely serrulate; sheath smooth; ligule membranous? Spikes with peduncles shorter than the very narrow sheaths, stout; lower 1-2 pairs of spikelets homogamous. Sessile fem. spikelets softly villous; gl. I not channelled dorsally; II linear, 3-nerved, with a coriaceous hispid centre and membranous wings; III smaller, hyaline, nerveless; IV awn slender, tortuous, red brown, column pubescent. Pedicelled spikelets male, pedicels very short glabrous, gl. I narrowly equally winged, glabrous, except for the bristles, II lanceolate, 3-nerved; IV oblong, hyaline.—I have seen only the top of a branch with a single leaf of this remarkable species. The ligule is imperfect.
- 68. A. oliganthus, Hochst. ex Steud. Syn. Gram. 368; dwarf, annual, leaves subensiform acuminate softly hairy margins thickened, spikes short,

joints and pedicels about half as long as the sessile spikelet long-ciliate, sessile spikelet $\frac{1}{2}$ in oblong, callus short obtuse, gl. I obtuse chartaceous dorsally villous toward the base not dorsally channelled shining faintly-nerved keels ciliolate towards the truncate tip, II obtuse apiculate, III very short broadly oblong ciliate, IV column of awn glabrous. Hack. Monogr. Androp. 591.

NILGHIBI HILLS; Wight, Hohenacker, &c.

Stems 3-6 in., tufted, slender, sometimes creeping below, geniculate. Leaves 2-3 in., quite flat, margins cartilaginous; sheaths compressed; ligule very short, membranous. Spikes usually very shortly exserted from the long narrow glabrous spathes; peduncle curved, puberulous. Spikes \(\frac{1}{2}\) in. long, with 3-6 pairs of glumes, lower spikelets neuter. Gl. I of seasile spikelets with narrowly involute margins, callus bearded; awn of IV 1\(\frac{1}{2}\) in. long, shining. Pedicelled spikelet larger than the sessile; gl. I obovate-oblong, obtuse, many and strongly nerved, margins ciliolate hardly incurved: II smaller, membranous, obtuse, 1-3-nerved, ciliate; palea of IV very small.—Hackel observes that this species is intermediate between Dichanthium and Heteropogon, but nearer the latter in the dorsal furrow of the sessile spikelet (which furrow I do not detect).

69. A. polystachyos, Roxb. Fl. Ind. i. 261; dwarf, erect, corymbosely branched, leaves slender short erect strict hairy, spikes ½-1 in. on slender strict naked peduncles, sessile fem. spikelets ½ in., callus densely bearded on one side with brown hairs, gl. 1 terete pubescent, awn 1½-2 in. base simple acute, pedicelled spikelets oblong many-nerved broadly winged glabrous. Steud. Syn. Gram. 367. A. pumilus, Roxb. Ic. ined. t. 2021 (non Fl. Ind.).

PRNINSULA of INDIA, Roxburgh, Wight.

Stem 6-10 in., slender, leafy above. Leaves 2-4 by \(\frac{1}{20} - \frac{1}{4} \) in., lower flat, upper convolute, acuminate, ciliate with long flexuous hairs, margins thickened; sheaths terete, lower keeled; ligule a line of hairs. Spikes pale brown (when dry), peduncle 2-4 in., with a very slender sheath and minute leaf about the middle; 5 or 6 lowest pairs of spikes neuter. Sessile fem. spikelets dark; gl. I rigid, many-nerved; II linear, coriaceous with broad hyaline margins; III shorter, oblong, ciliate; IV awn rather slender, column shortly hirsute. Pedicelled spikelets \(\frac{1}{4} \) in.; gl. I with a coriaceous many-nerved centre and broad hyaline infolded wings; II lanceolate, ciliate, 5-nerved, 2 pairs submarginal. Neuter spikelets; gl. I like the pc dicelled, but broader, tip 2-toothed; II lanceolate, 3-nerved, ciliate; III and IV oblong, 1 nerved, ciliate.—A curious little species, of which I have seen only indifferent specimens of Wight. In Roxburgh's Icones this and A. punilus, Roxb., are figured on the same sheet with the names transposed. Heteropogon polystackyon, Arn. (Wight Cat. 2321) under which is cited Roxburgh's A. polysiachyon is A. bellariensis, Hack.

Subgen. XI. CYMBOTOGON, Hack. Spikes 2, both sessile or a sessile and shortly stipitate terminating a peduncle which is more or less sheathed by a proper spathe, often divaricate or deflexed; joints and pedicels planoconvex, clavate bucciniform or linear, top concave with usually dilated toothed margins. Spikelets several pairs, lowest pair or pairs of one or both spikes homogamous, male or neuter; sessile spikelets fem. or bisexual, oblong to lanceolate, dorsally compressed; gl. I dorsally flat excavate or pitted, awnless, margins inflexed; II cymbiform, acute, keeled, awned or not; III oblong, hyaline, nerveless or 2-nerved; 1V smaller, narrow, hyaline, 2-cleft, awned in the cleft, awn capillary, rarely 0; palea minute or 0. Pedicelled spikelets male or neuter, dorsally strongly compressed.

- A. Column of awn of gl. IV glabrous (rarely awn 0).
- * Peduncle of spikes shorter than the proper spathe.
- † Joints of spikes and pedicels of upper spikelets copiously villous on the sides and back, hairs more or less concealing the sessile spikelet.
- 70. A. Iwarancusa, Jones in Asiat. Research. iv. (1795) 109; stem short or tall, leaves flat or convolute, panicle subsimple or decompound, joints of rachis and pedicels of upper spikelets subclavate tops toothed, sessile spikelets \(\frac{1}{4}\) in linear-lanceolate acute, gl. I dorsally flat glabrous, keels scaberplops or ciliolate.

Plains of N.W. India, from the Jumna westwd., and southwd. to Scind. The Western Himalaya, from Kashmir to Kumson, and Western Tibet, ascending to 8000 ft. N. Canaba and the Deccan.—Distrib. Westwd. to N. Africa.

Stems tuffed, on an annulate creeping rootstock, 6 in. to 6 ft. high; whole plant usually of a pale often glaucous green. Leaves 6 in .- 2 ft., narrowly linear, tips capillary, rigid or flexuous, glabrous or scaberulous, glaucous or pruinose beneath. midrib slender; sheaths glabrous, lower dilated; ligule shortly oblong, membranous, ciliolate. Panicle very variable, branches distant or crowded, subsimple or much densely or loosely branched; proper spathes \(\frac{1}{3} - \frac{1}{3} \) in., longer than the peduncle of the spikes, narrowly lanceolate. Spikes 4-3 in., unequal; spikelets 3-4 pairs. Sessile spikelets pale, sometimes reddish; gl. I thin, keels hardly margined not winged, nerves 0 or 2-4 between the carinal; II cymbiform, acute, 3-nerved; III 2-nerved: IV narrow, lobes subulate, ciliate. Pedicelled spikelets as long as or rather longer than the sessile, purplish, narrowly lanceolate; gl. I 7-9-nerved, keels scaberulous: II margins ciliate; III broadly oblong, hyaline, fimbriate.-Roots aromatic. There are no limits between A. Iwarancusa and laniger. The former is usually the larger plant, with broader leaves and often split sheaths, and is the most Eastern form. The authority for the name Iwarancusa as a specific one is not very Blane describing his Nardus indica says that Sir J. Banks regarded it as a species of Andropogon. Jones incidentally gives Irawancusa as the specific name; possibly he may have taken it from Banks.

Subsp. 1. A. IWARANGUSA proper; tall, much branched, leaves long flat, lower sheaths deciduous splitting into flat often tortuous lamine, paniele narrow compound. Kunth Enum. Pl. i. 493; Steud. Syn. Gram. 388. Hack. Monogr. Androp. 599; Rosb. Fl. Ind. i. 275; Ainslie Mat. Med. Ind. ii. 114; Wall. Cat. n. 8793; Trin. Sp. Gram. Ic. t. 326; Duthie Grass. N.W. Ind. 19. Cymbopogon Iwarancusa, Schult. Mant. ii. 458.—Nardus indica, Blane in Phil. Trans. lxxx. (1790) 284, t. 16.—Common in N. India. I have seen no N. African specimens with the lower leaf-sheaths of this form, a character which is, however, very inconstant.—Khuskus

grass.

Subsp. 2. A. LANIGER, Desf. Fl. Atlant. ii. 379; stem short subsimple, leaves junciform, lower sheaths hardened persistent, panicle narrow subsimple. Kunth Enum. Pl. i. 493; Steud. Syn. Gram. 386; Hack. Monogr. Androp. 598; Ailchis. Cat. Panjab. Pl. 174; Duthie Grass. N.W. Ind. 20, Fodd. Grass. N. Ind. 35, t. 23; Lisboa in Bomb. Journ. Nat. Hist. Soc. vi. (1891); Boiss. Fl. Orient. vii. 465. A. Arriani, Edgew. in Journ. Linn. Soc. vi. (1862) 208 (Ariani). A. circinnatus Hochst. & Steud. ex Steud. l. c. 387. A. criophorus, Willd. Sp. Pl. iv. 90. A. Olivieri, Boiss. Diagn. v. 76; Steud. l. c. 387. A. commutatus, Aitchis. in Journ. Linn. Soc. xix. (1882) 191 (non Steud). Cymbopogon arabicus, Nees ex Steud. l. c. 0. circinnatus, Hochst. in Schimp. Pl. Arab. exsicc. Ed. 2 (1844) n. 783. C. Arriani, Aitchis. l. c. C. laniger, Duthie in Atkins. Gaz. N.W. Ind. 640. Gymnanthelia lanigera, Anderss. in Schweinf. B.it. Fl Æthiop. 300.—A. laniger is the N. African form of the species, also common in N. India. Edgewotth's A. Arriani is certainly this. The A. commutatus of Affghanistan and Scind (Stocks) is also

this; whether the African plant of that name is the same is doubtful. I have not seen the Scind specimens of A. commutatus alluded to by Hackel (Monogr. 613); it is not probable that they differ from Stocks' plant.

†† Joints of spikes and pedicels of upper spikelets villous or ciliate on the sides, hairs not concealing the sessile spikelets, dorsally glabrous or sparsely rarely copiously hairy.

§ Leaf-sheaths terete.

71. A. Scheenanthus, Linn. Sp. Pl. 1046; sessile spikelets ovate-or obovate-oblong dorsally flat or nearly so with a deep narrow longitudinal cleft in the centre usually below the middle and answering to a ventral median rib, keels narrowly winged from or from above the middle, II acute keel with a serrulate wing above the middle; Kunth Enum. Pl. i. 493; Grah. Cat. Bomb. Pl. 238; Duthie Grass. N.W. Ind. 21, Fodd. Grass. N. Ind. 38, t. 26.

Hotter parts of India, wild or cultivated, from the Panjab to Burma and southwd. to Travancore and CEYLON.—DISTRIB. Westwd. to tropical Africa.

Annual? Stem 3-6 ft., erect. Leaves long, broad or narrow, finely acuminate glaucous or pruinose, smooth or margins scaberulous, base rounded or cordate and amplexicaul; sheath glabrous; ligule oblong, scarious. Panicle elongate, 1-2 ft. long, dense or lax, compound or decompound, rarely subsimple; proper spathes as long as the spikes, which are as long as the peduncle or shorter. Spikes unequal, one 3-4-jointed, the other 4-6-jointed; joints and pedicels narrowly clavate, half as long as the sessile spikelet, tips dilated and toothed, margins villously ciliate with long hairs. Sessile spikelets 1 in., callus obtuse shortly bearded; gl. I tip obtuse often irregularly toothed, dorsally 2-nerved or nerveless; II lanceolate, 3-nerved, ciliate, III oblong, ciliate; IV small, narrow, 2-fid, lobes subulate glabrous or ciliate; awn slender, twice as long as the gl. or longer. Pedicelled spikelets oblong-lauceolate, acute or obtuse; gl. I glabrous or puberulous, keels hardly ciliate; II ovate, acute, 3-nerved; III oblong, ciliate, 2-nerved.—As in the case of A. Nardus, this grass has been so extensively cultivated in India that it is impossible to say where it is wild, and its synonymy is so mixed up with that of A. Nardus, and the descriptions of both are so inexact, that until the whole subject of their culture and distribution has been botanically investigated by a skilled observer in various parts of India, their history must remain obscure. Botanically, A. Schonanthus is remarkable for the extraordinary difference between its broad and narrow leaved varieties. Some forms of the narrow leaved closely resemble states of A. Nardus, and can only be distinguished from it by the narrow cleft in the centre of gl. I of the sessile spikelet and its corresponding rib in the ventral face of that glume. The figure given by Ventenat (Hort. Cels. t. 89) is unreliable for any grass. I give below Hackel's classification of the varieties with their synonymy, adding one which he does not appear to have seen. I am quite unable to distinguish his vars, genuinus and versicolor.—"Geranium grass, Rusa oil grass, Oil of Ginger grass." Watt.

Subsp. genuinus, Hack. l.c. 609; panicle linear-oblong, secondary branches usually simple, spikes \(\frac{1}{2}\)-\(\frac{1}{2}\) in., dorsal cleft of gl. I hardly reaching the middle of the gl., gl. IV cleft \(\frac{1}{2}\)-\(\frac{1}{2}\) way down, awn perfect, pedicelled spikelets glabrous. Wall. Cat. 8794 L.

Var. Martini, leaf-base cordate and \(\frac{1}{2}\)-amplexicall, spathes and spikelets pale or spikelets reddish. A. Schoenanthus, Linn. l.c.; Lisboa in Journ. Bomb. Nat. Hist. Soc. iv. (1889) 120. A. Martini, Rosb. Fl. Ind. i. 277; Aitchis. Cat. Panjab. Pl. 175; Wight. Cat. n. 1702. A. giganteus, Hochst. in Flora (1844) 242. A. nardoides a, Nees Fl. Afr. Austr. 116. A. pachnodes, Tris. is Mom. Acad. Peterab. Ser. VI. ii. (1824) 284, Sp. Gram. Ic. t. 337. Gymnanthelia Martini, Anderss. in Schweinf. Beitr. Fl. Æthiop. 310.

Var. filiculmis, Hook. f.; stem 12-16 in., very slender, leaves $\frac{1}{2}-\frac{1}{6}$ in. broad, spikes reddish-brown.—Upper Burma, Fort Stedman, Herb. Hort. Calcutt.—

Probably only a depauperate form.

Var. versicolor, Hack. l. c. 610; leaf-base cordate semi-amplexical, spathes dull violet and red, spikelets more or less variegated or the pedicelled violet. A. versicolor, Nees in Wight Cat. n. 1705; Lisboa in Journ. Bomb. Nat. Hist. Soc. iv. (1889) 120, vi. (1891) 65. A. aromaticus, Sieb. Fl. Maurit. (Herb. Ewsicc.) n. 38. A. conuatus, Hochst. in A. Rich. Tent. Fl. Abyss. ii. 464. A. excavatus, Hochst. in Flora (1846) 116. A. foliatus & polyneuros, Steud. Syn. Gram. 385, 389. A. nardoides, β, Nees l. c. A. pachynodes, β, Nees Pl. Meyen. 190. A. pruinosus, Nees ex Steud. l. c. 388. A. Schoenanthus, Wall. Cat. 8794 C.N., 8795, Baker Fl. Maurit. 446; Trim. Cat. Ceyl. Pl. 107; Yent. Hort. Cels. t. 89. A. versicolor, Nees ex Steud. l. c.; Thw. Enum. Pl. Zeyl. 367. Gymnanthelia connata, Aschers & Schweinf. in Schweinf. Beitr. Fl. Æthiop. 310.

Var. cæsius, Hack. l.c.; whole plant more or less glaucous, stein slender, leaves very narrow base not dilated, panicle subsimple, gl. I narrowly winged. PA. bicornis, Forsk. Fl. Æg. Arab. 173. A. cæsius, Nees in Hook. & Arn. Bot. Beck. Vny. 244, in Pl. Meyen. 189; Wight Cat. n. 1700, 1700a. A. Martini, Benth. Fl. Hongk. 424. A. Iwarancuss, Boiss. Fl. Orient. v. 466. Andropogon, Wall. Cat.

n. 8796.

Var. gracillimus, Hook. f.; glaucous, stem very slender, leaves 2-4 by ½ in., panicle simple, joints of rachis of spikes and pedicels nearly glabrous, gl. I of sessile spikelet truncate dorsal channel deep or shallow. Andropogon, Wall. Cat. n. 8796 (Herb. Wight). Trachypogon cossius var. α, Nees in Herb. Wight.

Subsp. clandestinus, Hack. l.c. 612; habit of var. casius, but gl. I and II of the pedicelled spikelet pubescent. A. clandestinus, Nees ex Steul. l.c. 388. Andropogon. Wall. Cat. n. 8794 I K.—Burma, Wallich; Upper Burma, Herb.

Hort. Calcutt.

72. A. Nardus, Linn. Sp. Pl. 1046; stem tall paniculately branched leafy, leaves narrow flat, panicle subsimple to decompound, spikes in densely or loosely compacted sheathed fascicles or subsolitary, joints and pedicels rather slender tips dilated toothed, sessile spikelets \(\frac{1}{2}\)-\(\frac{1}{2}\) in. oblong or lanceolate, gl. I 2-toothed, dorsally flat or with shallow depressions or concave towards the base, margins winged or narrowly margined and scaberulous above the middle.

Throughout the hotter parts of India, Burma, the Malay Peninsula and

CEYLON, wild or cultivated.—DISTRIB. Trop. Asia, Africa, Australia.

In its common form it is difficult to distinguish A. Nardus from the narrow leaved form of A. Schanasthus, except by the cleit in the gl. I of the sessile spikelet of the latter; and not always very clearly by that. Both are cultivated in India and elsewhere, and A. Nardus is (except in foliage never having the broadly cordate leaf-base) quite as variable as its ally. I have been unable satisfactorily to correlate all of the Kew Indian forms with the elaborate classification of varieties established by Hackel. Both his and my conclusions must be regarded as provisional and as certain to be disturbed by a study of additional materials, or by a study of all the forms in their native localities by a specialist who has grasped the history of the species wild and cultivated, over a large area of its distribution. One of Hackel's varieties, distans, regarded as a species by Nees, should, I think, be restored to that rank (excluding a Ceylon plant included under it by Hackel); it is exclusively a Himalayan form, not found below 4000 ft., and is very constant in habit and foliage.

The var. genuisus, Hack., is founded on an awnless form of the plant, which I believe (with Roxburgh) to be a cultivated state, having seen no awnless specimens in the forms known to be wild. The name is therefore inappropriate botanically, whether or no it represents the first described state of the plant, and

better suppressed.

A. NABDUS proper; rootstock stout, stem tall stout leafy, leaves long narrow, panicle large often supra-decompound oblong or subpyramidal more or less interrupted, branches loosely or closely packed erect at length often drooping, spathes laxly or closely imbricate lanceolate, proper spathes $\frac{1}{2} - \frac{1}{2}$ in., spikes with 4-5 pairs of spikelets, joints and pedicels rather slender densely or laxly ciliate, sessile spikelets $\frac{1}{2} - \frac{1}{2}$ in. lanceolate awned, gl. I narrowly winged, awn long or short. A. Nardus, Bentl. & Trim. Medic. Pl. t. 297; Trim. Cat. Ceyl. Pl. 107. A. Nardus, var. grandis, Hack. (in part). A. cæsius, Nees in Wight Cat. n. 1700c. A. Schoenauthus, Wall. Cat. n. 8794 D. E. F. H.—From the Himalaya to Burma and southwd. to Ceylon and Malaya. Mergui, Griff. (Kew Distrib. 6762). Bengal, Griff. (K. D. 6760, 6761).

Forma culta; gl. I of sessile spikelet, dorsally flat or deeply hollowed, awn 0 or very short included in the glumes. A. Nardus. auct. plur. A. Schoonanthus, Roxb. Fl. Ind. i. 274; Wall. Cat. n. 8794 E. A. Roxburghii, Nees in Wight Cat. n. 1699; Steud. l.c. 395. A. Martini, Thw. Enum. Pl. Zeyl. 367. A.

Nardus, var. genuinus, Hack. Monogr. Androp. 662 in part.

Forma abnormis, spathes empty. A. cresius, Nees in Wight Cat. n. 1700d.

Anthistiria, Wall. l. c. n. 8768.

Var. nilagiricus, Hack. l. c. 604; tall, stem very robust sometimes as thick as the little finger, leaves 2-4 ft. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in. glaucous beneath, ligule coriaceous, panicle 10-12 in. narrow, proper spathes about \(\frac{1}{2}\) in. broadly lanceolate cymbiform acuminate, sessile spikelets \(\frac{1}{2}\)-\(\frac{1}{2}\) in. dorsally flat smooth or with shallow depressions hardy winged nerves obsoure, lobes of gl. IV subulate, awn short or long. A. nilagiricus, Hockst. in Hohen. Pl. Ind. Or. (1851) n. 932. A. confertificus, Steud. l. c. 385. A. Nurdus, var. glomeratus, Hack. l. c. A. Schoenanthus, Wall. Cat. 8794 B in part. Nilghiri Hills, Wight (Herb. n. 3087) &c.; Conoor, alt. 6000 ft. Gamble. Ceylon.—The spathes are normally broader than in Nardus proper.

Var. luridus, Hook. f.; stem 5-6 ft., leaves long, panicle elongate rather broad

Var. luridus, Hook. f.; stem 5-6 ft., leaves long, panicle elongate rather broad decompound branches or narrow with sparingly divided branches, spikes in large rounded crowded fascicles drying of a very dark purplish brown, spathes cymbiform, outer $\frac{1}{2} - \frac{1}{4}$ in., shorter than the purplish black shortly peduceled spikes, pedicels and joints slender sparsely ciliate with long spreading hairs, sessile spikelets $\frac{1}{4} - \frac{1}{4}$ in. lanceolate, gl. I dorsally flat or concave especially below, keels winged above the middle, lobes of gl. IV long ciliate.—Nilghiri Hills, Schmid. Ceylon,

Gardner, Maxwell.-Thwaites, A. distans may be this or A. nilagiricus.

Var. khasianus, Hack. l.c. (in part); tall, leaves 2-3 ft., panicle elongate 1-3 ft. narrow, branches short compound or decompound, spathes narrowly lanceolate outer \(\frac{1}{4} - \frac{1}{4} \) in., proper \(\frac{1}{4} - \frac{2}{4} \) in., spikes \(\frac{1}{4} - \frac{2}{4} \) in., joints and pedicels slender shortly villous, sessile spikelets \(\frac{1}{4} - \frac{1}{4} \) in. oblong-lanceolate obtuse, gl. I dorsally flat or with very shallow depressions, very rarely channelled down the centre (as in A. Schananthus) keels broadly winged above the middle, nerves 2-5 between the keels usually well marked from the middle or above it to near the top, IV rather broadly linear lobes long ciliate. A khasianus, Munro mss.—Khasia Hills, alt. 3-5000 ft., Griffith (Kew distrib. 6759, 6764, 6765); Munnepore, alt. 3500 ft., Clarke.—Wall. Cat. n. 8794 H. referred here by Hackel has no nerves or wings to gl. I of the sessile spikelets and is, I think, a form of normalis.

Var. grandis, Hack. l. c. 605 (in part); tall, stout, leaves 2-3 ft. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., panicle narrow loosely branched, branches distant often drooping, outer spathes \(\frac{1}{2}\)-\(\frac{1}{2}\) in., proper spathes 1-\(\frac{1}{4}\) in., joints and pedicels shortly ciliate, sessile spikelets \(\frac{1}{6}\)-\(\frac{1}{2}\) in. oblong-lanceolate obtuse dorsally flat or slightly concave below keels margined or winged above the middle nerves obscure, keel of II sometimes shortly winged above the middle, lobes of gl. 1V ciliate, awn \(\frac{1}{2}\)-\(\frac{1}{2}\) in. A. Schoenanthus, Wall. Pl. As. Rar. iii. t. 280, Cat. n. 8794 (in part). PA. pendulus, Nees ex Steud. l. c. 388. —Nepal, Wallich. Sikkim, Terai and hot valleys, J. D. H., &c. Bengal, Griffith (Kew distrib. n. 6773). Rajmahal, Herb. Hort. Calcutt.—The very long outer spathes are seen in no other variety, but they are found shortening in some specimens to the ordinary length of khasianus and others.

Var. coloratus; stem subsimple, leaves chiefly radical 1/4 in. broad glaucous

beneath, branches of panicle few, spathes and spikes densely fascicled red-brown when dry, proper spathes about 1 in. very narrow, sessile spikelets as in A. Nardus proper, of which this is a small state with highly coloured spathes. A. coloratus, Nees en Wight Cat. n. 1703. Wall. Cat. n. 8794 B (in part). -S. India, Heyne,

Var. flexuosus, Hack. l. c. 603; stem slender, paniele decompound, branches very slender flexuous almost zigzag, proper spathes about 1 in. narrow divergent, spikes very short with 2-4 pairs of spikelets, joints and peduncles slender laxly ciliate with spreading hairs, sessile spikelets 1-1 in. lanceolate, gl. I acuminate 2-cuspidate dorsally flat nerveless keels margined scabrid, gl. IV ciliate, awn short. flexuosus. Nees ex Wight Cat. n. 1704; Steud. l. c. 388.—Southern India, Heyne,

Wight.

Var. microstachys, Hook. f.; tall, very slender, leaves narrow, paniele very long slender erect bearing few distant solitary or subsolitary erect filiform branches with one or few very small deflexed spikes, sheaths very narrow tubular erect 1-1 in., spikes 1-1 in., joints 2-3, pedicels rather stout shortly ciliate, spikelets 1-1 in. ovate-oblong or -lanceolate, gl. I dorsally flat or concave below the middle, keels margined or winged nerves obscure or 0, IV very narrow lobes ciliate .- Forests of Oudh, Thompson. Garo Hills, Mann .- A very distinct-looking plant, from the long erect lower branches and narrow sheaths of the very long slender panicle, short spikes and small spikelets. In the Oudh specimen gl. I is rather broadly winged, and awn short; in the Garo one gl. I is scarcely margined and the awn in. long. In some respects it approaches 74, A. microtheca.

Var. exsertus, Hack. l. c. 608; stem not tall slender, leaves very long and narrow, panicle elongate very narrow, branches short distant, spikes few subsolitary long-peduncled, proper spathes about 1 in., spikes 1-1 in., joints 5-6 and pedicels rather slender shortly villous, sessile spikelets in. ovate or oblong 2-toothed dorsally flat or slightly concave 1-2-nerved keels margined or shortly winged, IV eciliate awned. A. Schoenanthus, Wall. Cat. n. 8794 M.-Hort. Bot. Calc., Wallich. Bengal, Griffith (Kew distrib. n. 6763, probably Hort. Calc.).—Probably a form of

A. Nardus altered by culture.

Var. Stracheyi, Hook. f.; tall, slender, leaves long narrow, panicle strict erect very narrow lax-fid., branches short with few spikes, proper spathes about 2 in. cymbiform, spikes 1-1 in. brown, joints 6-8 and pedicels subclavate shortly ciliate. spikelets 1-1 in. lanceolate or linear-lanceolate, gl. I bicuspidate, dorsally flat or more or less hollowed nerveless keels hardly margined, IV broad lobeselongate strongly ciliate, awn 1 in. A. Martini, Herb. Strach. & Winterb. n. 2.—Kumaon, at Kalenath, alt. 6000 ft., Str. & W. Kunawur, Pangi, Stolizka.

73. A. distans, Nees ex Steud. Syn. Gram. 387; rootstock 0, roots fibrous, stem 1-2 ft., leaves almost filiform flexuous, proper spathes 3-1 in., spikes 1-11 in. solitary or few together scattered forming a subsimple panicle, joints and pedicels narrowly clavate silkily ciliate, sessile spikelets 1-1 in narrowly lanceolate dorsally flat 5-7-nerved between the narrowly winged keels, keels of II winged above the middle, lobes of IV ciliate. Duthie Grass. N.W. Ind. 19. A. Nardus var. distans, Hack. Monogr. Androp. 608.

TEMPERATE HIMALAYA, alt. 4-7000 ft. (to 9000 ft. in Garwhal, Duthie), from

Kashmir to Kumaon, Royle, &c.

A very distinct odoriferous form or species, confined to elevations above 4000 ft. on the Himalaya, conspicuous for its almost simple (not paniculately branched) stems, leaves very narrow and tufted at their bases, distant large pale or reddish long deflexed spikes and very narrow long spikelets with strong nerves on gl. I of the sessile, tips of gl. I of the sessile spikelets more or less, sometimes deeply 2-cuspidate, margins of gl. II pubescent, IV broader than in A. Nardus proper with long subulate-lanceolate ciliate lobes.—Specimens collected by Falconer and by Duthie, at 8900 ft. in Garwhal, have filiform flexuous or tortuous leaves. The Ceylon A. distans, Thwaites, from Newera Elia, is a much longer leaved plant, has very dark spikes and is a dwarf starved state of A. nilagirica, I suspect. Lisboa (Journ. Bomb. Nat. Hist. Soc. vi. (1891) cites A. distans as a native of N. Canara, but I have no means of confirming the identification.

74. A. microtheca, Hook. f.; tall, panicle elongate narrow decompound, branches very slender erect elongate, spikes \(\frac{1}{6}-\frac{1}{2}\) in. solitary rarely fascicled shortly peduncled deflexed, proper spathes \(\frac{1}{2}\) in. narrowly lanceolate divaricate, spikes very short, joints few and pedicels clavate or bucciniform mouth toothed margins very shortly ciliate, sessile spikelets \(\frac{1}{2}\)-\(\frac{1}{2}\) in., gl. I ovate-lanceolate or lanceolate dorsally deeply concave with thickened margins, pubescent in the hollow.

EAST NEPAL; hot valleys, alt. 3-4000 ft., J. D. H.

Stem 3-4 ft., slender. Leaves long, narrow. Panicle leafy below; leaves on the flowering branches short, erect, strict, appressed to the branches, bearing in their axils the very small peduncled proper spathes which project horizontally; peduncle of spikes about half the length of the proper spathe and wholly concealed in it, the very small few-fid. spikes alone being exserted; proper spathes 1 in., narrowly lanceolate, acuminate, strict, glabrous. Gl. I of sessile spikelets variable in breadth, rarely flat dorsally, keels scaberulous above the middle, tip minutely 2-cuspidate; II acute, keel scaberulous below the tip; III ovate-oblong, acute, 2-nerved, ciliate; IV narrow, 2 fid, lobes subulate eciliate, awn 1 in.; palea minute, oblong or orbicular. Pedicelled spikelets (sometimes fem.), ovate-oblong, subacute, gl. I 7-nerved, keels scaberulous; II acuminate, 3-nerved; III oblong, obtuse; IV linear, tip 2-fid, 1-nerved nerve excurrent; palea minute, ovate. - The long slender branches of the panicle, with rather distinct spikes, and divergent proper spathes, short stout pedicels and joints, and minute spikelets (the smallest of the Indian Cymbopogons) characterize this species. Its nearest ally is N. Nardus var. microstachys. Munro had given the mss. name of Hookers to it; but it is not his A. Hookers of Bhotan, nor that described by Hackel. The pedicelled spikelets described above are abnormal in being female.

75. A. Gidarba, Ham. ex Wall. Cat. n. 8797; stem slender subsimple, leaves narrow, panicle narrow elongate, branches rather distant short, joints and pedicels clavate, sessile spikelets $\frac{1}{8} - \frac{1}{8}$ in., gl. I linear-lanceolate 2-toothed dorsally deeply concave below the middle with a boss at the base of the cavity, keels scaberulous neither winged nor margined. Steud. Syn. Gram. 387; Hack Monogr. Androp. 613; Duthie Grass. N.W. Ind. 20.—Andropogon, Wall. Cat. n. 8797, 8798 D.

WESTERN HIMALAYA, Falconer, &c.; Simla, alt. 7-8000 ft., Duthie. BEHAE, at Monghir, Hamilton; Gya, Herb. Calcutt.

Stem 4-6 ft., erect. Leaves 1-2 ft., finely acuminate, glabrous on both surfaces or puberulous above, midrib slender, margins smooth ciliate towards the base; sheath terete, glabrous; ligule short, truncate. Pasicle very slender, branches simple or the lower divided; proper spathes \(\frac{1}{2}\)-1 in., narrowly lanceolate, about twice as long as the peduncle. Spikes \(\frac{1}{2}\)-1 in., strict, at length deflexed; joints and pedicels shortly villous. Sessile spikelets pule or dark green, with sometimes a dorsal circular pit above the middle, margins raised; II cymbiform, acute, 1-nerved; III lanceolate, 2-nerved; IV narrow, 2-cleft, lobes subulate ciliate; awn \(\frac{1}{2}\)-1 in., capillary. Pedicelled spikelets rather longer than the sessile, lanceolate, acute, glabrous.—Odour described as terebinthine.

- §§ Leaf-sheaths compressed, keeled.
- 76. A. Hookeri, Munro ex Hack. Monogr. Androp. 614; tall, slender, leaves long linear, panicle linear interrupted, branches suberect nearly simple, proper spathes \(\frac{1}{2}\)-l\(\frac{1}{2}\) in., joints and pedicels of spikes stout clavate, sessile spikelets \(\frac{1}{2}\) in. dull violet dorsally deeply concave puberulous keels scabrid.

BROTAN? Griffith (Kew Distrib. n. 6767 em Hack.).

Leaves 12-16 by 15-15 in, rather rigid, smooth, margin scabrid, midrib broad keeled below; ligule obtuse, membranous, glabrous. Passicle 12-16 in.; primary branches of 1-2 nodes giving off solitary secondary. Spikes subequal, joints and pedicels dorsally glabrous, margins sparsely villous, tips 2-3-lobed. Sessile spikelets, g!. I coriaceo-chartaceous, acute, minutely 2-toothed, keels not margined or winged obeturely 2-nerved; II lanceolate, acute, keel scabrid, margin eciliate; IV 2-cleft, lobes slender eciliate; awn about \$\frac{1}{2}\$ in. Pedicelled spikelets equalling the sessile plants in the Kew Herbarium.—I have not recognized the above amongst Griffith's plants in the Kew Herbarium. The Bhotan plant bearing the number 6767 in that Herbarium and named by Munro A. Hookeri, is not a Cymbopogon, but probably a Schizachyrium, in too imperfect a state for determination. Munro has also attached the name A. Hookeri to my A. microtheca, which was appropriate for a plant first found by myself.

- ** Peduncle of spikes longer than the proper spathe.
- 77. A. lividus, Thwaites Enum. Pl. Zeyl. 367; erect, leaves narrow rigid, spikes long-peduncled, pedicels and joints clavate, sessile spikelets in., gl. I lanceolate obscurely 2-toothed keels with narrow scaberulous wings, II shortly awned with a dorsal serrulate wing above the middle, IV deeply 2-fid segments villously ciliate. Hack. Monogr. Androp. 615; Trim. Out. Ceyl. Pl. 107.

NILGHIRI HILLS, Schmid. CEYLON; Mountains, alt. 7000 ft., Thwaites, (C.P. 953).

Stems 1-2 ft., tufted, strict, smooth, rigid. Leaves 4-6 in., strict, erect, acuminate, strongly nerved, nearly smooth; lower sheaths short; ligule oblong. Peduncles 1-4, terminal and axillary; spikes 1-2 in., erect, dull reddish-brown; joints and pedicels about half as long as the sessile spikelet, margins ciliate with silky hairs, tips cupped and toothed. Sessile spikelet, callus very short; gl. I flat, glabrous, margins broadly incurved below, nerves obscure; II narrow, ciliate, dorsally rounded; III oblong, ciliate, 2-nerved; IV as long as III; awn very slender, about twice as long as the spikelet; palea 0. Pedicelled spikelets as long as the sessile, linear-oblong, subacute, dorsally convex, glabrous, many-nerved, keels scaberulous, margins broadly incurved; II ovate-oblong, acuminate, sub 3-nerved, ciliate; III as in the sessile; IV as long, hyaline.—Schmid's Nilghiri specimen was distributed by Dr. Stahl mixed with A. pertusus, which it strongly resembles.

B. Column of awn hirsute.

78. A. filipendulus, Hochet. in Flora, xxix. (1846) 115; Steud. Syn. Gram. 389 (filipendulinus). Hack. Monogr. Androp. 634; Trim. Cat. Pl. Coylon, 107. A. finitimus, Hochet. ex A. Rich. Tent. Fl. Abyss. ii. 465; Steud. l. c.; Hack. l. c. 637; Baker Fl. Maurit. 446. A. Griffithii, Munro in Cat. Pl. Griffith, Falconer, &c. 58 (ined.). A. lachnatherus, Benth. Fl. Austral. vii. 434. A. procerus, F. Muell. Fragm. viii. 124 (non Br.). Hyparrhenia finitima, Anderss. in Schweinf. Beitr. Fl. Æthiop. 310. Anthistiria fasciculata, Thw. Enum. Pl. Zeyl. 366.

KHASIA HILLS, Griffith, Clarke. CEYLON; Badulla district, alt. 3000 ft.,

Thwaites.—DISTRIB. Trop. Asia, Afr., and Austral.

Stems 3-4 ft., erect, leafy, subsimple or branching from the base, nodes glabrous. Leaves 2-3 ft. by $\frac{1}{10}$ in., linear, setaceously acuminate, scaberulous or smooth. margins scabrid; sheath terete, smooth, glabrous or mouth hairy; ligule short, membranous. Panicle 1-2 ft., narrow, compound, branches slender, nodes glabrous or pubescent. Spathes 1-3 in., linear-lanceolate, acuminate, or tips setaceous, glabrous ciliate or hairy. Peduncle much shorter than the spathe, bearded above with white hairs. Spikes 1-2 in., one subsessile with one pair of homogamous spikelets, the other 10-1 in. long with two (rarely 0) homogamous pairs; heterogamous spikelets 1-3 pairs; joints and pedicels very short, linear, ciliate or villous, tips very oblique. Gl. I of sessile spikelets 1-1 in.; callus acute, bearded; gl. I membranous, truncate. 5-7-nerved, glabrous or villous, dorsally slightly channelled or not; II oblong, obtuse, keel glabrous or ciliate, 3-nerved; III linear-oblong, obtuse, hyaline, ciliate; IV shorter, 2-toothed, glabrous; awn 2-2; in., column hispid with rufous hairs. Pedicelled spikelets linear-lanceolate, gl. I acute, 7-9-nerved, keela setulose: II oblong, keeled; III and IV. hyaline or 0 .- Homogamous spikelets not awned .-Hackel has 4 varieties under A. filipendulus, depending chiefly on the relative length of the spathe and peduncle, and the number 1 or 2 of the heterogamous spikelets. Of these y. Thwaitesii is the Ceylon plant, with one pair of heterogamous and two of homogamous on the stipitate spike. A. finitimus has normally 2-3 pairs of heterogamous spikelets on each spike. These and two other African species, A. Barteri, Hack., and A. familiaris, Steud., are very closely allied, and regarded by Hackel as probably subspecies of filipendulus.

DOUBTFUL AND EXCLUDED SPECIES OF Andropogon.

A. CITRATUS, DC. Cat. Hort. Monsp. 78, name only .- May be either A. Nardus

or A. Schananthus, ex Huck. Monogr. Androp. 608.

A. CYMBACHNE, Hack. Monogr. Androp. 450. Cymbachne ciliaris, Rets. Obs. vi. 36. Rottboellia Cymbachne, Willd. Sp. Pl. i. 465. ? Arthrostachys gracilis, Desv. Opusc. 74, t. 6, f. 2.—Bengal, Kanig.—An obscure plant, described by Hackel from an incomplete specimen in the Copenhagen Herbarium, and referred to the section Arthrolevis.

A. CYMBARIUS, Linn. Mant. ii. 803; Hack. l. c. 629. An African plant, stated

by Linnseus to have been found in India by Konig.

A. DACTYLOIDES, Steud. ex Duthie Grass. N.W. Ind. 19. P Lepeocercis digitata, Nees.—Doab, and banks of the Jumna, Royle.—A. dactyloides, Steud., is Trachypogon polymorphus, Hack., not an Indian plant, and Lepeocercis digitata, Nees ex Royle, is a name only, not taken up by Hackel.

A. DEPAUPERATUS, Kunth Revis. Gram. i. 166, Enum. Pl. i. 509; Hack. l. c. 565. Pollinia depauperata, Spreng. Pugill. ii. 11, Syst. Veg. i. 289.—Bengal.—An

indeterminable species of subgen. Chrysopogos.

A. DIVERSIFLORUS, Steud. in Zoll. Syst. Verz. 58, is Polytrias pramorea, Hack.

(Androp. 189), a Javanese plant not hitherto found in British India.

A. FLABBLLIFORMIS, Roxb. ex Spreng. Pugill. ii. 9, Syet. Veg. i. 283; Kunth l. c. 509; Hack. l. c. 651.—Bengal.—Is indeterminable.

A. FULYUS, Spring. Pugill. ii. 8, Syst. l. c. 287; Kunth l. c. 508; Hack. l. c. 565.

-Bengal.-Is undeterminable.

54. ANTHISTIRIA, Linn.

THEMEDA, Forek.

Tall, annual or perennial grasses. Leaves long, narrow. Spikes many, short, crowded in spathaceous panicled fascicles, each in a proper spathe, very shortly peduncled, inarticulate at the base. Spikelets 6-11; 4 lowest

male or neuter, involucriform, awnless, in superposed pairs or whorled round a jointed rachis which bears one or more sessile bisexual or fem. usually awned spikelets, each with one or if more than one then the uppermost with pedicelled male or neuter awnless spikelets inserted on its callus. Bisexual (or fem.) spikelets linear-oblong; callus long or short; gl. I terete, or dorsally compressed or channelled, coriaceous, at length hardened, margins incurved not keeled; II as long, coriaceous, 3-nerved, keeled, keel broad, margins thin incurved; III oblong, hyaline, 1-nerved; IV the very slender sometimes narrowly hyaline base of an awn, rarely awnless; palea 0. Lodicules cuneate. Stamens 3. Styles free, and stigmas long. Grain oblong. Pedicelled spikelets lanceolate, dorsally compressed; pedicels slender, compressed; gls, 1-3, I many-nerved, margins inflexed, keels often winged; II as long as I, 1-3-nerved, hyaline, or 0; III smaller or 0.—Species about 10; warm regions of the Old World.

The species of this genus are most difficult of discrimination, of which the best proof is the irreconcilable conclusions of two excellent botanists, both experts in the Order of Graminex, Andersson (in Nov. Act. Upsal. III. ii. (1856), and Hackel

(Monogr. Androp.).

Hackel has restored Forskahl's name of Thomeda because of its having four years of priority, and of Linnaus' description of Anthisticia being very inaccurate. The claim of priority is obvious, but if that of inaccurate description is admitted it should invalidate the recognition of a host of the genera of old authors. Against both claims stands the fact, that Anthisticia had for upwards of a century been adopted by all botanical writers.

- * Involucrant spikelets inserted on a level, all sessile; glumes 3, solitary in A. arguens.
- 1. A. arguens, Willd. Sp. Pl. iv. 901; annual, spikes in lax nodding heads, outer spathes 3-5 in. very narrow base hirsute, proper spathes \(\frac{1}{2}\)-1 in., involucr. spikelets 2-4 \(\frac{1}{2}\)-\frac{1}{3} in. unequal, glume solitary. Kunth Enum. Pl. i. 482; Steud. Syn. Gram. 401. A. frondosa, Br. Prodr. 200; Benth. Fl. Austral. vii. 542. A. arundinacea, Hassk. in Tijdschr. Nat. Gesch. x. 115 (non Roxb.). A. ciliata var. Junghuhniana, Büse ex Miq. Fl. Ind. Bat. iii. 504. A. pilifera, Steud. in Zoll. Syst. Verz. 58, Syn. Pl. Gram. 400. A. Junghuhniana, Nees in Jung. Jav. ex Anderss. in Nov. Act. Upsal. Ser. III. ii. 233. Aristaria barbata, Jungh. in Tijdschr. Nat. Gesch. vii. 296. Themeda arguens, Hack. Monogr. Androp. 657. Stipa arguens, Linn. Sp. Pl. Ed. II. 117.

MALACCA, Griffith. Andaman Islds., Prain.—Distrib. Malaya, Australia. Stems tall or short, sometimes 10 ft. high, stout or slender. Leaves 10-16 by \$\frac{1}{2}\$ in. or narrower, and sheaths glabrous or sparsely hairy; ligule rounded. Heads of spikes flabelliform, long-peduncled; spikes with often imperfect scattered linear hyaline spikelets on the peduncle. Invol. spikelets very irregular, often only 2, linear-lanceolate, hyaline, 5-6-nerved. Bisexual spikelets \$\frac{1}{2}\$ in., solitary, cylindric, with a long pungent dorsally brown-bearded callus, brown when ripe, obsourely nerved, smooth and dotted below, scabrid and hispid towards the tip. Awa very stout, often 3 in. long, dark brown.—The Malaccan specimens are small (1-2 ft.), and weaker than the insular.

2. A. imberbis, Retz. Obs. iii. 11; perennial, spikes in globose or fan-shaped fascicles, spathes glabrous or sparsely hairy, outer 1-2 in., proper about $\frac{1}{2}$ in., invol. spikelets $\frac{1}{3}-\frac{1}{3}$ in. glabrous or ciliate with tuberclebased hairs gls. 3, bisexual spikelets solitary $\frac{1}{4}-\frac{1}{3}$ in. with 2 pedicelled

scabrid towards the tip only, callus long pungent. Kunth. Enum. Pl. i. 481; Steud. Syn. Gram. 401. A. Forskahlii, Kunth Revis. Gram. i. 162, Enum l. c. 483; Steud. l. c. 402. A. vulgaris, Hack. in Engl. & Prantl. Natürl. Planzenf. ii. II. 29. Themeda triandra, Forsk. Fl. Ægypt. Arab. 178. T. polygama, Gmel. Syst. 149. T. Forskahlii, Hack. Monogr. Androp. 659; Duthie Fodd. Grass. N. Ind. 43.—Anthistiria, Wall. Cat. n. 8764, A. C. E. F.

Hotter drier parts of India, from Upper Bengal to Travancore, ascending the Himalaya to 3-4000 ft. (Var. Roylei to 10,000 ft.). BURMA. CEYLON, ascending to

4000 ft.—DISTRIB. Warm regions of the Old World.

Stem 1-6 ft., stout or slender, subsimple or branched. Leaves 8-10 in., linear, rather rigid, glabrous or sparsely hairy, green or subglaucous beneath; ligule short, ciliolate. Head of fascicles of spikes few or many, long- or short-peduncled; spathes glabrous or ciliate with usually very small tubercle-based hairs; proper spathes longer than the spikes, cymbiform, tips acute or subacute. Involucr. spikelets 1 in., oblong-lanceolate, acute or acuminate, red brown, dorsally hispidly ciliate or glabrous, glumes 3. Bise sual spikelets cylindric, obtuse, with long brown hairs; gl. I terete, dorsally rounded, ripe polished dark brown, hispidulous towards the tip only; awn 1-2 in long, base capillary. Pedicelled spikelets very narrow, glabrous or ciliate with a few tubercled based hairs, keels ciliolate.—A very variable grass, some states of which are with difficulty distinguishable from A. ciliata. The earliest names of this plant are Themeda triandra, For k., and Anthistiria imberbis, Retz. Hackel has abandoned both, substituting first Anthistiria vulgaris; and then Themeda Forskahlii, on the ground that A. imberbis was perhaps not Forskahl's T. triandra (why then call it Forskahlii?) of which no type specimen exists, and because triandra indicates a character of no individual value in grasses. In so doing he overlooked Gmelin's a name of T. polygama (Syst. 149). Having regard to the wide range of A. imberbis, from Australia to Africa, its presence in Arabia might well be anticipated; and that it is a native of that country is now proved by Schweinfurth's finding Hackel's var. glauca in that country. This makes the var. (which is local, and not Indian) the type of the species, and, if Forskahl's name of Themeda is to be retained, necessitates a rearrangement of the varieties. To me it appears most expedient to retain Retz's name which applies to the prevalent form over the area of distribution as the specific one.

The following is Hackel's arrangement of the Indian forms which may be variously reduced or added to. It has the great merit of systematizing the authorities fairly well. Of these I have kept up var. laxa as a species, following Andersson, though not without doubts. Of others, as A. polystachya, I am doubtful, judging from Roxburgh's description and its being an annual, I suspect it may be a state of ciliata. Andersson included it under A. arguens, which it certainly

18 not

* Stem 1-3 ft. Leaves 2-8 by 10-1 in. Panicle 6-12 in., nodes 2-3, lower branches simple below. Gl. I of invol. spikelets not winged or narrowly on one

side only.

Var. vulgaris, Hack. l. c. 660; spikelets with many tubercle-based hairs. A. ciliata, Retz. l. c. (non Linn. f.); Lamk. Ill. t. 841, f. 2; Cav. Ic. t. 459; Rosb. Fl. Ind. i. 247; Wight. Cat. n. 1708; Anderss. in Nov. Act. Sc. Upsal. ii. (1856), in Walp. Ann. vi. 1057; Grah. Cat. Bomb. Pl. 239; Dals. & Gibs. Bomb. Fl. 804; Thw. Enum. Pl. Zoyl. 866 (escl. var. major); Trim. Cat. Coyl. Pl. 108; Benth. Fl. Austral. vii. 542. ? A. polystachya, Rosb. l. c. 248; Kunth Enum. Pl. i. 481; Steud. l. c.

Var. imberbis, Hack. l. c. 661; invol. spikelets glabrous or very sparingly hairy. A. ciliata var. imberbis, Nees in Linnaa vii. (1832) 284. A. ciliata var.

Gmelin has, by oversight probably, assumed the first word of Forskahl's brief diagnosis to be his specific name.

major, Thw. l. c. 366. A. ciliata? Munro in Herb. Griff. (Kew distrib. n. 6808).

A. australis, Br. Prodr. 200; Kunth l. c.; Steud. l. c.; Anderss. t. c. 13; Walp.

l. c. 1058. A. arguens, Wight Cat. n. 1709. A. imberbis, Rets. Obs. iii. 11;
Kunth l. c. 481 (excl. Syn.).—Anthistiris, Wall. Cat. 8764, A. E. F.

** Stems 3-5 ft. Leaves 8-16 by 1-1 in. Panicle 16-24 in.; nodes 5-6; lower branches usually compound. Gl. I of invol. spikelets with often broad

scarious margins.

Var. major, Hack. l. c. 662; proper spathes and invol. spikelets hirsute with green or white tubercle-based hairs. A. ciliata, Thunb. Fl. Jap. 40; Wight Cat. n. 1708. PA. puberula, Anderes. l. c. 12; Walp. l. c. 1038 (see Var. Roylei).

*** Annual? Stem very slender, unbranched; leaves very narrow.

Var. Roylei, Hook. f.; spikes few in peduncled axillary fascicles, spathes glabrous outermost 2-3 in. proper rather longer than the spikes, invol. spikelets \(\frac{1}{2}\) in. naked or with a few cilia, bisexual \(\frac{1}{2}\) in. hispid towards the tip, pedicelled longer glabrous, keels not ciliate. PA. puberula, Anderss. l. c. 12; Walp. l. c. 1058. A. ciliata, \(\beta\), Ness in Herb. Royle.—N. W. Himslaya, Royle; Simla Hills, Thomson. Kummon, alt. 7500 ft., Strach. & Winterb. (A. ciliata).—A very distinct form, and the only temperate one of \(A.\) imberbis. It closely resembles \(A.\) Hookeri, the only other temp. Himalayan species, which has superposed pairs of much larger invol. spikelets solitary spikes and short spathes. The glabrous spikelets and larger sessile spikelets hispid at the top distinguish it from ciliata.

3. A. laxa, Anderss. in Nov. Act. Sc. Upsal. Ser. III. ii. (1856) 243; perennial, stem tall stout leafy proliferously branched, panicles of spikes small of few spikelets in a long lax subsimple leafy panicle shortly peduncled, outer spathes \(\frac{1}{2} - \frac{1}{2} \) in., proper spathes nearly glabrous hardly longer than the spikes, involuc. spikelets \(\frac{1}{2} - \frac{1}{2} \) in. nearly glabrous gls. 3, bisexual spikelets \(\frac{1}{2} - \frac{1}{2} \) in. solitary with 2 pedicelled, callus short, pedicelled spikelets glabrous or nearly so, awn \(1-1\frac{1}{2} \) in. Walp. Ann. vi. 1059. Themeda Forskahlii, var. ? laxa, Hack. Monogr. Androp. 663.—Anthistiria, Wall. Cat. n. 8775.

NEFAL, Wallick. BHOTAN, Griffith. CENTRAL PROVINCES; Khandwa, Duthie. Intermediate between A. imberbis and ciliata, with very stout erect polished stems 2-3 ft. high, as thick as a goose-quill, and very small nearly glabrous heads of spikes. The panicle is leafy and all the leaves are very narrow. There is a specimen in the Kew Herbarium from Roxburgh, but without habitat. It may prove to be a form of A. imberbis, with small spikelets, or of strigosa, with unarmed spathes and spikelets.

- 4. A. ciliata, Linn. f. Nov. Gram. Gen. S5; annual, spikes in globose or fan-shaped fascicles, outer spathes 1-3 in. glabrous or sparingly ciliate, proper spathes and spikelets usually copiously clothed with tubercle-based bristles, invol. spikelets \(\frac{1}{2} \) in. gls. 3, bisexual spikelets \(\frac{1}{2} \) \(\frac{1}{2} \) in usually solitary with 1 or 2 pedicelled spikelets scabrid, callus short obtuse, awn 1-1\(\frac{1}{2} \) in. Gwrtn. Carp. ii. 465, t. 175; Lamk. Illustr. t. 841, f. 1; Beauv. Agrost. t. 23, f. 7; Steud. Syn. Gram. 401; Duthie Grass. N.W. Ind. 42; Baker Fl. Maurit. 448. A. barbata, Desf. in Journ. Phys. zl. 294, t. 2. A. scandens, Rowb. Fl. Ind. i. 248. A. semiberbis, Nees Fl. Afr. Austr. 125. Themeda ciliata, Hack. Monagr. Androp. 664. Andropogon nutaus, Linn. Mant. ii. 303. A. quadrivalva (err. typog.) Linn. Syst. Veg. Ed. xiii. 758.—Anthistiria, Wall. Cat. n. 8764 B. D.
- N.W. India, Royle, Kumson, ascending to 7500 ft., Nepal, Wallich. Bengal, Resburgh. Behab, J. D. H. The Concan, Central Provinces, Malabar and Tenasserim.—Distrib. Mascarene Islds.

In habit and size A. ciliata often resembles the ordinary states of A. imberbis and it

varies quite as much as that species does. The diagnoses given above serve to distinguish them, especially the small size of the spikelets of A. ciliata, its annual habit and the large size of the tubercles on which the far more copious rigid bristles are inserted. Boxburgh describes it as perennial and scandent, with stems many feet long, rooting at the nodes, but Hackel has pointed out that Roxburgh's description is that of an annual; and as I have seen it growing in Bengal, it is rather a scrambler amongst bushes than scandent in a strict sense. The stems are also often erect with a geniculate base.

Var. Helferi; dwarf, spikes in more compact globose heads. A. Helferi, Munro mss. Themeda Helferi, Hack. l. c. 665.—Tenasserim, Helfer.—I think this is only a dwarf variety of A. ciliata, specimens of which accompany it in Helfer's

herbarium.

5. A. strigosa, Ham. inss.; perennial, stem tall rather stout, spikes in small dense shortly peduncled heads arranged in a long very narrow panicle with filiform leaves, spathes very short glabrous, invol. spikelets $\frac{1}{2}-\frac{1}{6}$ in. gls. 3 dorsally clothed with very rigid tubercle-based bristles, bisexual spikelets 1-2 $\frac{1}{7-6}$ in. hispidulous towards the tip, callus short obtuse, awn very short capillary.—Anthistiria, Wall. Cat. n. 8766.

LOWER ASSAM, Hamilton. BEHAR; Monghyr, Herb. Calcutt.

Stem 3-4 ft., erect, as thick as a small goose-quill, polished. Leaves 1 ft. by \(\frac{1}{2} \) in., smooth, tips filiferous; sheaths polished, terete, keeled; ligule a narrow ciliolate membrane. Panicle 1-2 ft., with one or two lower long axillary branches; leaves of panicle 6-10 in., flexuous; fascicles of spikes triangular, about \(\frac{1}{2} \) in. broad, outer spathes hardly longer than the fuscicles cymbiform with very slender tips, glabrous. Invol. spikelets gl. I margins narrowly winged; II as long, acuminate, 3-nerved; III lanceolate, hyaline, 1-nerved. Bisexual spikelets terete; callus bearded with white hairs; gl. II coriaceous, notched, awned; III shorter, hysline, 1-nerved; IV the very narrow bifid hyaline margin of an excessively slender awn \(\frac{1}{2} \) in. long; palca minute. Gl. I of pedicelled spikelets lanceolate, keels with long stiff tubercle-based hairs.—The long panicle and very small heads with short spathes, and the strongly armed gls. of the invol. and pedicelled spikelets distinguish this from A. imberbis, and ally it to ciliaris with which it agrees in the size and armature of the spikelets.

- ** Involucrant spikelets in superposed pairs, glumes 3 or 4.
- † Callus of bisexual spikelets short, obtuse.
- 6. A. tremula, Nees ex Steud. Syn. Gram. 401; tall, slender, panicle sparingly branched, spikes in subflabelliform fascicles \(\frac{1}{2}\)-1 in. broad, outer spathes \(\frac{1}{2}\)-1 in., invol. spikelets softly hairy, bisexual spikelets 1 or 2 hispidulous deeply dorsally channelled, awn \(\frac{1}{2}\)-\(\frac{1}{2}\) in. Thw. Enum. Pl. Zeyl. 366; Trim. Cat. Ceyl. Pl. 108. A. arguens, Heyne ex Wall. Cat. n. 8765. Androscepia tremula, Anderss. in Nov. Act. Upsal. Ser. III. ii. (1856) 247. Themeda tremula, Hack. Monogr. Androp. 667.—Anthistiria, Wall. Cat. l. c.

The DECCAN PENINSULA; from the Concan and Central Provinces southwd.

CEYLON, Walker, Thwaites (C.P. 961 in part).

Perennial? Stem tufted, 1-8 ft., rarely thicker than a crow-quill. Leaves 6-12 in., finely acuminate, nearly smooth, margins scaberulous, upper often exceeding the panicle; ligule a narrow membrane. Panicle 1-2 ft., subsimple, of many usually distant compound fascicles of spathes and spikes on flexuous capillary peduncles \frac{1}{2}-1 in. long; lower branches sometimes elongate and again panicled; fascicles red brown when dry, the larger sometimes semiglobose; outer spathes usually hardly longer than the fascicles, proper spathes not twice as long as the spikes, sides and keel ciliate.

Invol. spikelets \(\frac{1}{2}\) in.; gls. 3, ovate-lanceolate, acuminate, margins with narrow scarious wings, dorsally copiously ciliate with tubercle-based hairs; II as long, lanceolate, acuminate, membranous, 3-nerved; III as long, hyaline, lanceolate, acuminate, 2-nerved. Bisexual spikelets \(\frac{1}{2}\) in., usually 2, lower with one pedicelled spikelet, upper with two; callus hairs rusty. Pedicelled spikelets lanceolate, gls. 3; I lanceolate, dorsally ciliate with long hairs and one margin winged; II and III as in the involucrant spikelets.

7. A. Thwaitesii, Hook. f.; tall, very stout, nodes glaucous, panicle leafy, spikes in dense subflabelliform fascicles 1-1; in. broad, outer spathes 1-2; in., bisexual spikelets 2 hispidulous dorsally channelled, awn 1 in.

CEYLON, Thwaites (C.P. 961 in part).

Perennial? Stem probably 5-6 ft., thicker than a goose-quill, polished. Leaves 1-2 ft. by 1-3 in., finely acuminate, tips setaceous; ligule a ciliolate narrow membrane. Panicle 12 in. or more; rachis stout, leafy; leaves 6-10 in. long. Fascicles of spikes as in A. tremula, but larger and less hairy.

8. A. Cymbaria, Roxb. Fl. Ind. i. 261 (excl. Syn.); tall, stout, panicle supradecompound thyrsiform, spikes innumerable glabrous densely crowded in small long peduncled narrow fascicles $\frac{1}{4}-\frac{1}{2}$ in. long, proper spathes $\frac{1}{4}-\frac{3}{4}$ in. linear-lanceolate, invol. spikelets $\frac{1}{8}-\frac{1}{6}$ in. acuminate glabrous gls. 4, bisexual spikelets solitary (rarely 2) awned, callus hairs white soft = $\frac{1}{4}$ the spikelet. Kunth Enum. Pl. i. 482, excl. Syn., Suppl. 396; Steud. Syn. Gram. 399; Grah. Cat. Bomb. Pl. 219; Dalz. & Gibs. Bomb. Fl. 304; Thw. Enum. Pl. Zeyl. 436; Trim. Cat. Ceyl. Pl. 108. Andropogon serratifolius, Herb. Heyne ex Wall. Cat. n. 8771 B. Themeda Cymbaria, Hack. Monogr. Androp. 668.—Anthistiria, Wall. Cat. n. 8771.

NILGHIRI HILLS, Wight, Schmid. MYSORE or the CARNATIC, Herb. G. Thomson.

CEYLON; Matelle East, Thwaites (C.P. 3257, 3803).

Perennial. Stem 3-8 ft., as thick as a swan's quill below, puberulous beneath the nodes. Leaves 2-4 ft. by \$\frac{1}{2}\$-\$\frac{1}{4}\$ in., not overtopping the panicle, scaberulous above, glaucous beneath, margins scabrid; sheaths subcompressed, keeled; ligule very short. Panicle tall, 1-2 ft., branches smooth or scaberulous; spikes in oblong fascicles \$\frac{1}{2}\frac{1}{4}\$ in. long. Invol. spikelets, red or blueish, keels scabrid. Bisexual spikelets linear-oblong; gl. I shining below, scaberulous above; awn \$\frac{1}{4}\frac{1}{4}\$ in., slender.

9. A. anathera, Nees ex Royle Ill. Bot. Himal. 417 (name); upper leaves erect exceeding the elongate subsimple panicle, spikes few in pedicelled fascicles, involucr. spikelets \(\frac{1}{2} \) in., glumes 4, keels of gl. I with tubercle-based hairs, bisexual spikelets 2-3 linear-lanceolate not awned, keels of gl. I ciliotate. Steud. Syn. Gram. 402; Aitch. Cat. Panjab Pl. 173; Duthie Grass. N. W. Ind. 23, Fodd. Grass. N. Ind. 42; Boiss. Fl. Orient. v. 460. Androscepia anathera, Anderss. in Nov. Act. Sc. Upsal. Ser. III. ii. (1856) 249. Themeda anathera, Hack. Monogr. Androp. 669.—Anthistiria, Wall. Cat. n. 8773.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4500-7000 ft., and to

9000 ft. in Garwhal, Duthie .- DISTRIB. Affghanistan.

Perennial. Stem erect, 1-4 ft., slender, leafy. Leaves very narrow, \(\frac{1}{2}\)-\(\frac{1}{6}\) in. broad, rigid, glaucous, margins and upper surface scabrous, scaberulous beneath; sheaths glabrous; ligule oblong, obtuse. Punicle 1-2 ft., narrow, glabrous; proper spathes \(\frac{1}{2}\)-1 in., linear-lanceolate, acute. Spikes glabrous. Involucr. spikelets more or less hispid, one of each pair shortly stipitate.—Wallich's habitat for his n. 8773, "Bengal, near the Calcutta Bot. Gardeu," is either an error or the plant was an escape from cultivation. Andersson has two varieties, a. hirsuta, invol. spikelets

wholly and pedicelled partially covered with tubercle-based hairs, and β . glabrescens, more glaucous, leaves pruinose, invol. spikelets dorsally glabrous or scabrous above, pedicelled glabrous.

- §§ Callus of bisexual spikelets acute.
- 10. A. Hookeri, Griseb. in Goetting. Nachr. (1868) 91; stem slender simple or sparingly branched above, spikes (with their proper sheath) axillary solitary long-peduncled glabrous, invol. spikelets \(\frac{1}{2} \frac{3}{2}\) in. sessile linear-lanceolate acuminate gls. 3, bisexual spikelets 1 or 2 scabrid above the middle dorsally rounded, awn \(\frac{1}{2}-1\) in. A. gigantea subsp. caudata, in part, Hack. Monogr. Androp. 676. Androscepia glabrata, Anderss. in Herb. Kew.

SIKKIM HIMALAYA; interior ranges, alt. 6500-9000 ft., J. D. H., Gammie. Stem 1-2 ft., shortly creeping at the base, erect or geniculately ascending, as thick as a crow-quill or less. Leaves very narrow, rarely } in. broad, quite smooth, subglaucous beneath, tips filiform; sheath smooth; ligule short ciliolate. Spikes axils in the long erect very slender leaves, rarely geminate in one short outer spathe, in. long, laterally compressed (without an outer spathe exceeding the proper), peduncle 1-2 in., filiform, enclosed sometimes up to the spike in a very slender spaths with a subulate tip; proper spathe linear-lanceolate, acuminate. Rachis of spike usually exceeding the invol. spikelets and proper spathe, nearly glabrous. Invol. spikelets quite glabrous, keels smooth, very narrowly winged. Bisesual spikelets like those of A. imberbis in form and colour of gl. I, and in the conic acute callus densely villous with rusty-red hairs; gl. II scabrid towards the tip; awn geniculate, narrowed below to a capillary base; lodicules membranous. Pedicelled spikelets much longer than the bisexual, narrowly lanceolate, acuminate, glabrous, keels hardly scaberulous; pedicels slender, glabrous except at the base.—Though nearest allied to A. gigantea, which is a thoroughly tropical grass, this species most resembles A. imberbis, and especially its var. Roylei, from which it is at once distinguished by wanting the long outer spathe, and by the superposed invol. spikelets.

11. A. gigantea, Cav. Ic. t. 36; tall, usually stout, spikes few in narrow pedicelled fascicles terminating the branches of a compound or decompound inclined or nodding rarely subsimple panicle, proper spathes rather longer than the spikes, involuer. spikelets linear-lanceolate, one of each pair deciduous, bisexual spikelets 1-3 rufously hirsute dorsally channelled. Themeda gigantea, Hack. Monogr. Androp. 672.

LOWER HIMALAYA; from Kumaon eastwards, to ASSAM, BEHAR and the KHASIA HILLS, ascending to 4000 ft.—DISTRIB. China, Malaya, Australia, N. Caledon.

Stem 8-16 ft., often nearly 1 in. diam. below, erect, solid, terete, glabrous, simple below, branching above, leafy. Leaves 4-8 ft. by \(\frac{1}{2}-1\) in, linear, setaceously acuminate, scaberulous above, glaucous beneath, margins scabridly serrulate, base narrowed, midrib broad, lower bifarious; lower sheaths compressed; ligule short, membranous, ciliolate. Panicle 1-3 ft., oblong, rarely simple, inclined, branchlets flexuous; spikes often pendulous; spathes narrowly cymbiform, keel and nerves scabrid. Spikes as long as the proper spathes or shorter; peduncle much shorter than the spathe, filiform, erect or divaricate. Invol. spikelets \(\frac{1}{2}\) \(\frac{1}{2}\) in.; gl. I linear-lanceolate, setaceously acuminate, glabrous or hirsute with fulvous hairs, keels scabrid; II shorter, acuminate, ciliate; III and IV still shorter, linear-oblong or lanceolate, ciliate. Bisexual spikelets \(\frac{1}{2}\) in., linear-lanceolate; callus \(\frac{1}{2}\) in. villous with long brown hairs; gl I corfaceous, acute or acuminate, dorsally 1-3-channelled, more or less villously hirsute all over or below the middle with brown hairs; II acute in the awnless spikelets, obtuse in the awned; III oblong-lanceolate, 1-nerved; IV = III, linear-lanceolate in the awnless spikelets, acute, 1-nerved in

the awned; IV the hyaline base of the awn.—Hackel classifies the form of this protean plant under 6 subspecies and 12 varieties. Of these the Indian (exclusive of intermediates) may be grouped as follows. They do not affect definite areas, and some of

them may be different states of one variety.

Subsp. genuina, Hack. 1. c. 672; panicle decompound, branches branchlets and peduncle of spike villous with rusty hairs, proper sheaths 1-1½ in., spikelets ½-½ in. or more dorsally hirsute with rusty-brown hairs, bisexual spikelets 1-3 in each raceme ½ in. awned or not. A. gigantea, Cav. l.c. A. vulpina, Anderss. in Nov. Act. Sc. Upsal. III. ii. (1856) 245. Androscepia gigantea, var. a, Brongn. in Voy. Coq. Bot. 78; Kunth Enum. Pl. i. 484 (escl. Syn.). Calaminea gigantea, Roem. & Sch. Syst. ii. 810 (non Beauv.). Perobachne secunda, Presl. Rel. Hænk. i. 348, t. 48: Kunth l. c. 485.

Subsp. arundinacea (including subsp. intermedia), Hack. l. c. 674; panicle compound dense or lax, branches and branchlets glabrous, proper spathes 1½-2 in. ciliatt, invol. spikelets ½-½ in. dorsally hireute with golden or rusty hairs, bisexual spikelets 1 rarely 2 in each spike about ½ in long, awn 1½-4 in. A. arundinacea, Roxb. Fl. Ind. i. 251; Kunth Revis. Gram. i. 363, t. 95, Enum. 482, Suppl. 394; Steud. Syn. Gram. 401; Duthie Grass. N.W. Ind. 23, Fodd. Grass. N. Ind. 42. A. subsericans, Ness ex Steud. l. c. Cymbopogon arundinaceum, Schult. Mant. ii. 457.—Anthistiria, Wall. Cat. n. 8763, 8772, 8774 B.—Subsp. intermedia, differs from arundinacea in the less hirsute male spikelet and in the awn reduced to a bristle.

Subsp. villosa, Hack. l. c.; panicle large decompound, branches and branchlets glabrous or scaberulous, proper spathes 1-1½ in., spikes erect or divaricate, invol. spikelets ½-½ in. glabrous smooth or scaberulous, bisexual spikelets ½-½ in., awn ½-½-½ in. or 0. A. villoss, Poir. Encycl. Suppl. i. 396; Lamk. Ill. t. 841, f. 3; Steud. l. c. A. mutica, Steud. l. c. Androscepia gigantea & mutica, Anderss. l. c. 248 (excl. Syn.), t. 3 (gigantea). Andr. gigantea, var. sundaica, Buese Pl. Jungh. i. 364. Aristaria mutica, Hassk. in Tijdschr. Nat. Gesch. x. 117, in Ann. Sc. Nat. Ser. 3, iv. 178. Heterolytron scabrum, Jungh. l. c.—Anthistiria, Wall. Cat. n. 8776.—Assam, Khasia Hills, Malacca, Java.

Subsp. cardata & longispatha, Hack. l. c. 676, 677; panicle laz-fid. subsimple or decompound, branches and branchlets glabrous, proper spathes 1-1½ in., spikes often divergent, invol. spikelets ½-½ in., keels scabrid glabrous, bisexual spikelets 2-3 in each spike, awn ½ in. A. caudata, Nees in Hook. & Arn. Bot. Beech. Voy. 245; Steud. l. c. 442. Androscepia gigantea, var. himalayensis, Rupv. es Anderss. l. c. 248. Andr. gigantea, v. armata, Anderss. l. c.—Anthistiria, Wall. Cat. n.

8774 A.

Var. longispatha, Hack. l. c. 677; leaves glaucous beneath smooth except the scabrid margins, atems and sheaths quite glabrous, panicle broad compressed, branches scaberulous, pedicelled spikelets nearly smooth except the scabrid keels, involucr. spikelets about \$\frac{1}{2}\$ in.—Terai of the Himalaya, Kuntse.—I have seen no authentic specimen.

DOUBTFUL SPECIES.

ANTHISTIBIA sp.? an imperfect specimen from Chota Nagpur, Dr. Wood (Herb. Calcutt.) with the invol. gis. of A. gigantea, var. villosa, but with very broad leaves deeply cordate and amplexicall at the base.

55. ISBILEMA, Hack.

Differs from Anthistiria in each spike being jointed below the involucral spikelets on the top of its peduncle, and falling away from it as a whole after flowering; whereas in Anthistiria the involucrant spikelets are persistent and the rest of the spike deciduous. In the former case, as Hackel observes, the dispersal of the species is by the wind, in the latter

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by the callus of the bisexual spikelets piercing the skin or becoming otherwise attached to animals.—Species 5, tropical Asiatic and Australian.

- * Keel and submarginal nerves of the spathes granulate or tubercled.
- 1. **I. Wightil,** Anderss. in Nov. Act. Soc. Sc. Upsal. Ser. 3, ii. 251; panicle decompound rather dense, spathes linear-lanceolate shorter or rather longer than the peduncle, invol. spikelets $\frac{1}{6}$ in. almost concealing the bisexual. Hack. Monogr. Androp. 679; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 218. Anthistiria prostrata, Willd. Sp. Pl. iv. 901; Roxb. Fl. Ind. i. 250. A. cimicina, Edgew. in Journ. As. Soc. Beng. (1852) 182 (in Bot. Zeit. (1852) 860); Steud. Syn. Gram. 400; Duthie Grass. N.W. Ind. 24. A. Wightii, Nees ex Steud. l. c.; Duthie l. c. A. Linnæana, Steud. l. c. Andropogon prostratus, Linn. Mant. ii. 304. Cymbopogon glandulosus, Spreng. Pugill. ii. 14.—Anthistiria, Wall. Cat. n. 8770.

Throughout India; from the Panjab eastwards to Burma, and southwards to Malabar and Mysore.

Perennial; stem 6 to 3 ft., erect or hase decumbent, rarely as stout at the base as a goose-quill, usually slender; nodes often bearded. Leaves 4-8 in., narrow, smooth or scaberulous, floral scabrid with tubercled margins, upper glabrous or hairy; ligule membranous, truncate. Panicle long or short, more or less compound; branches crowded or distant, strict or geniculate; nodes bearded; lower spathes foliaceous, floral \(\frac{1}{2} \) in., keels and margins tubercled. Involucr. spikelets male or neuter, pedicelled, oblong-lanceolate; gl. I 5-ribbed, scaberulous. Biscaual spikelets, gl. I bicuspidate; II 3-nerved; IV a slender awn three times as long as the spikelet or longer.—Very variable in stature, length of leaves and habit of the panicle.

2. I. argutum, Anderss. l. c. 252; panicle linear elongate very lax, spathes elliptic-lanceolate about three times as long as the peduncle of the spike, invol. spikelets \(\frac{1}{4}\) in. shorter than the bisexual. Hack. Monogr. Androp. 681. Anthistiria arguta, Nees ex Steud. Syn. Gram. 401.—Anthistiria, Wall. Cat. n. 8769.

BURMA; at Prome, Wallich.

Stem 2-3 ft., very slender, leafy at the base, compressed below. Leaves 3-6 in., narrowly linear, coriaceous, smooth except towards the spinulose rounded tips, deeply striate, midrib broad, floral with spinulose margins and ciliate base; sheath compressed; ligule a very short membrane. Panicle almost filiform, flexuous, with distant almost capillary branches; nodes ciliate; spathes \(\frac{1}{2}\)-\(\frac{1}{2}\) in., keels and nerves granulate or tubercled. Invol. spikelets shortly stoutly pedicelled, linear-lanceolate; glumes 2, I 5-ribbed scaberulous, keels ciliate, tubercled; II 3-nerved. Bissaual spikelets linear-lanceolate; gl. I long-beaked, beak scabrid; IV a slender awn.—The materials are scanty; more specimens may modify the above characters.

- ** Keel and submarginal nerves of spathe not granulate or tubercled.
- 3. I. laxum, Hack. Monogr. Androp. 682; panicle slender, spikes erect, invol. spikelets with short filiform pedicels covering the fem. glumes 3 glabrous, bisexual spikelet narrowly lanceolate pedicelled glabrous. Duthie Fodd. Grass. N. Ind. 43; Lisboa in Journ. Bomb. Nat. Hist. Soc. vi. (1891) 218. T. prostratum, Anderss. in Nov. Act. Soc. Sc. Upsal. Ser. 3, ii. 251 (excl. Syn.), t. 111. Anthistiria prostrata, Willd., B. glaucescens, Nees in Wight Cat. n. 1711 b. Andropogon parviflorus, Herb. Wight ex Wall. Cat. 8767 C. A. prostratum, Herb. Russ. ex Wall. Cat. l. c. D.—Anthistiria, Wall. Cat. n. 8767 A (in small part), B. C. D.

UPPER GANGETIC PLAIN; Patna, Wallich. The DECCAN PENINSULA, from the Concan southward, Wight, &c.

Stems tufted, 8-36 in., erect or ascending. Leaves narrow, 3-10 in., linear, obtuse, base ciliate; sheaths lax; ligule membranous, truncate. Panicle flexuous, narrow; branches short, distant; spathes \(\frac{1}{2}\) in., elliptic-lanceolate, reddish, keel and nerves scabrid. Invol. spikelets \(\frac{1}{2}\) in.; pedicels glabrous; gl. I oblong-lanceolate subacute, 5-nerved; II 3-nerved; III linear. Bisexual spikelets; pedicel ciliate; gl. I chartaceous, lanceolate, acuminate, tip truncate; II acuminate, 1-nerved; IV awn \(\frac{1}{2}\)-\frac{1}{2}\) in., very slender.

4. I. anthephoroides, Hack. Monogr. Androp. 683; panicle crowded leafy, racemes divergent, invol. spikelets very shortly broadly pedicelled glumes 2, I with 5 strong villous ribs, bisexual spikelet subsessile. Anthistiria prostrata, var. spic. masc. longe ciliatis, Wight Cat. n. 2335. Anthistiria, Wall. Cat. n. 8767 A.

The SOUTHERN DECCAN PENINSULA, Wight, &c.

Nearly allied to T. laxum, but a shorter stouter plant, with more crowded branches of the panicle and racemes.

551. PSEUDANTHISTIRIA, Hook. f.

Not in Clavis, p. 5.

Annual grasses, with the habits and characters of Anthistiria, but wanting the involucrant spikelets of that genus.—Distrib. India.

Pseudanthistiria was regarded by Hackel as an anomalous section of his subgenus Hypogynium of Andropogon, with the habit of Anthistiria. As I have pointed out above (p. 168) it is a remarkably distinct genus of Andropogoneæ with characters totally at variance with those of Hypogynium as given the "Monogr. Androp." I think that it is one of a natural group with Anthistiria, Iseilema, Heteropogon and Germainia. I am doubtful as to the specific value of some of the following, more copious material of all collected by good observers is wanting in this, as in so many other genera of grasses.

1. P. heteroclita, Hook. f.; leaves 6-12 in. linear glabrous or more or less ciliate nerves distinct, fascicles of spikes about \(\frac{1}{2} \) in. broad, proper spathes \(\frac{1}{4} \) in. hardly longer than the spikes, sessile spikelets \(\frac{1}{2} - \frac{1}{2} \) in. hispidulous all over, awn \(\frac{2}{3} \) in. base lanceolate. Andropogon heteroclitus, Nees Fl. Afr. Austr. 115; Steud. Syn. Grum. 389; Hack. Monogr. Androp. 400. A. monomeros, Hochst. in Hohen. Pl. Ind. Or. n. 183. Anthistiria heteroclita. Roxb. Fl. Ind. i. 249; Kunth Enum. Pl. i. 483.

BENGAL; pastures near Calcutta, Roxburgh. The Concan and Canaba, Law, Thomson, &c.

- Stem 1-2 ft., geniculate, slender, rarely as thick as a crow-quill, smooth, subsimple or branched. Leaves \(\frac{1}{6}\)-\(\frac{1}{4}\) in broad, ciliate on both surfaces together with the sheaths and margins with long tubercled-based hairs in Calcutta specimens, nearly glabrous in Western ones; sheaths much shorter than the internodes; ligule short, membranous. Panicle not large, leafy, compound, with many shortly peduncled fascicles; proper spathes and pedicelled spikelets with a few long tubercle-based bristles; keel ciliate; base of awn linear-lanceolate.—I have seen no Bengal specimens, but the excellent figure in Roxburgh's "Icones picta" leaves no doubt in my mind as to its being of the same species as the western plant, only more copiously ciliate. A specimen in Herb. Kew from Hackel was communicated as Anthistiria tremula, the likeness between these two plants being so deceptive.
- 2. **P. hispida**, *Hook. f.*; leaves 6-10 in linear and sheaths ciliate with long hairs or glabrescent, nerves distinct, fascicles of spikes \(\frac{1}{2}\) in broad copiously hirsute with tubercle-based bristles, outer spathes $1\frac{1}{2}$ -2 in long,

proper spathes much longer than the spikes, sessile spikelets in., gl. I terete glabrous except as to the scabrid summit, awn 1-11 in.

The Concan, Stocks, Law, Dalmell, &c. CENTRAL PROVINCES; Khandwa, Duthie (No. 8478).

- Stem 1-2 ft., rather stout, erect. Leaves \(\frac{1}{2}\) in. broad, base narrowed, scaberulous above and on the margins. Panicle elongate, simple, leafy.—Closely allied to P. heteroclita, and perhaps only a variety of it, but a stouter more hispid plant of a pale green colour, with much longer fascicles of spikelets with longer spathes and glabrous sessile spikelets.
- 3. P. umbellata, Hook. f.; stem filiform straggling, leaves 1-2 in. glabrous linear-oblong acute base rounded sessile or petiolulate, nerves very slender, fascicles of spikelets few axillary $\frac{1}{4} \frac{1}{8}$ in. broad with few sparingly ciliate spathes and spikes, outer spathes $\frac{1}{4} \frac{1}{8}$ in. proper spathes rather longer than the spikes, sessile spikelets $\frac{1}{10} \frac{1}{8}$ in. scaberulous, pedicelled naked, awn $\frac{1}{2} \frac{3}{8}$ in. Andropogon umbellatus, Hack. Monogr. Androp. 401. Anthistiria heteroclita, β foliis glabris, Wight Cat. n. 1706.

DECCAN PENINSULA, Wight; Cochin, Johnstone. CHYLON, Gardner, &c.

A very slender glabrous plant, with prostrate creeping branched stems rooting at the nodes. Leaves distant, with a few scattered cilia on both surfaces, nearly smooth; sheaths shorter than the blade. Fusciles of spikelets axillary, glabrous or with a few tubercle-based cilia, on simple rarely branched capillary peduncles shorter than the leaves; lower peduncles sometimes elongate 1-3 in. long and bearing several fascicles; outer spathes \(\frac{1}{2}\) \(\frac{1}{2}\) in. long. Spikes 3-6 in a fascicle, proper spathe glabrous. Gl. I of sessile spikelet dorsally concave; base of awn as in P. ketercelits.

4. P. burmanica, Hook. f.; stem filiform straggling, leaves 1-2 in., linear-oblong or lanceolate glabrous, nerves very slender, fascicles of spikelets few axillary very narrow with few sparsely ciliate spathes and spikes, outer spathes 1-1½ in., proper spathes longer than the spikes, sessile spikelets \(\frac{1}{10-\frac{1}{2}}\) in. scaberulous, pedicelled naked, awn 1-1½ in. base subulate-hastate.

PRGU, Kurs.

Habit of P. umbellata (of which it is possibly a variety) but leaves narrower, fascicles of spikelets 1-1½ in. long, very narrow, with much longer awns, the base of which is suddenly dilated and hastate or sagittate at the dilatation.

Tribe V. PHALARIDEM. (See p. 5.) 56. PHALARIS. Linn.

Annual or perennial grasses. Leaves flat. Spikelets 1-fld., in contracted or spiciform panicles, laterally compressed, rachilla with 1 or 2 minute scales (imperfect gls.) below gl. III, beyond which it is not produced, jointed at the base. Glumes (perfect) 3, I and II subequal, empty, persistent, keels winged or not; III much smaller, bisexual, 3-5-nerved, thin, at length coriaceous; palea like the gl. 2-nerved. Lodicules 2. Stamens 3. Styles 2, free. Grain ovate or oblong, free within the gl.—Species 9 or 10 temperate and tropical.

The uppermost glume alone being flowering should technically refer this genua to the Series of Panicacea; but its affinities are with Poacea. P. canariensis, Linn. (Canary Grass) is given as a N.W. India Grass by Duthie and others, but I have seen no specimens; it closely resembles P. minor, differing in the quite entire wings of the g's. P. paradoza, Linn. fil., is stated by Duthie Grass. N.W. Ind. to

be Indian on the authority of Wallich (Nepal), and Stewart (The Panjab); but in Fodd. Grass. N. Ind. he says that he has not seen specimens; nor have I. It is a Mediterranean plant.

- * PHALABIS proper. Spikelets in a dense cylindric or ovoid spiciform panicle; gls. I and II with winged keels.
- 1. P. minor, Retz. Obs. iii. 8; Kunth Enum. Pl. i. 32; Trin. Diss. ii. 254, Sp. Gram. Ic. t. 79; Steud. Syn. Gram. ii.; Wight Cat. n. 1738; Duthis Grass. N.W. Ind. 25, Fodd. Grass. N. Ind. 45; Aitchis. Cat. Panjab Pl. 158; Ledeb. Fl. Ross. iv 455; Boiss. Fl. Orient. v. 472. P. ambigua, Fig. & Notar. in Mem. Acad. Turin. Ser. II. xii. (1852) 826, t. 10, f. 6. P. aquatica, Ait. Hort. Kew. i. 56. P. bulbosa, Desf. Fl. Atlant. i. 35 (non Linn.). P. canariensis, Wall. Cat. n. 3782 (non Linn.). P. capensis, Thunb. Proft. Fl. Cap. 19. P. nepalensis, Trin. Sp. Gram. Ic. t. 80; Kunth l. c. 33; Steud. l. c. 10; Duthis l. c. Alopecurus otiporensis, Griff. Notul. iii. 94, Ic. Pl. Asiat. t. 143, f. 1.

Plains of WESTERN INDIA, and the HIMALAYA from Kashmir to Nepal, ascending to 5000 ft.—DISTRIB. Westwd. to the Canaries, S. Africa, Austral.

Annual. Stem 1-3 ft., stout or slender, leafy. Leaves long, linear, acuminate; sheath smooth; ligule oblong, scarious. Panicle small and ovoid, or longer and cylindric, 2\frac{1}{2}-3\frac{1}{2} in. long by \frac{3}{2} in. diam. green. Spikelets \frac{1}{2} in. broad, very shortly pedicelled, shining; gls. I and II acuminate, wings irregularly crenate or serrulate; III ovate, acute, silky, with one bristle-like imperfect gl. at its base.

- ** DIAGRAPHIS, Trin. (Gen.). Spikelets in a thyrsiform panicle; gls. I. and II. not winged.
- 2. P. arundinacea, Linn. Sp. Pl. 55; Fl. Dan. t. 259; Host Gram. Austr. ii. t. 33; Engl. Bot. t. 2160; Kunth Enum. Pl. i. 33, Suppl. 23; Steud. Syn. Gram. 11; Boiss. Fl. Orient. v. 474. P. americana, Ell. Sketch. i. 101. P. colorata, Beauv. Agrost. 172. P. intermedia, Bosc ex Poir. Encycl. Suppl. i. 300. P. picta. Hort. ex Steud. Nom. Ed. I. 609. Digraphis arundinacea, Trin. Fund. Agrost. 127; Ledeb. Fl. Ross. iv. 454. D. americana, Loud. Hort. Brit. 27. Baldingera arundinacea, Dumort. Obs. Gram. Belg. 130. B. colorata, Gertn. Mey. & Scherb. Fl. Wett. i. 96. Calamagostis colorata, DO. Fl. Franc. iii. 26. Arundo colorata, Ait. Hort. Kew. i. 116; Engl. Bot. t. 402; Knapp. Gram. Brit. i. 98.

KASHMIR; Wolar Lake, alt. 5550 ft., Falconer, &c.-DISTRIB. N. temp. and

Arctic regions.

Perennials. Rootstock creeping. Stems 2-6 ft., stout, erect. Leaves long, \(\frac{1}{2}\) in. broad, finely acuminate; sheaths smooth; ligule large. Panicle 4-8 in., subserect; branches 1-2 in., spreading in flower. Spikelets \(\frac{1}{2}\) in., densely crowded on the scabrid branchlets, very shortly pedicelled; gl. I and II glabrous, lanceolate, acuminate; I nerveless; II 3-nerved; III ovate-lanceolate, sparsely hairy, with 2 minute linear gls. on the rachilla. Lodicules silky.

DOUBTFUL SPECIES.

P. PECTINATA, Roth. Nov. Sp. 34; Kunth Enum. Pl. i. 34; panicle cylindric spiciform, gl. I and II navicular margins membranous ciliate-pectinate, outer corolla 2-valved villous.

57. ANTHOXANTHUM, Linn.

Annual or perennial sweet-scented grasses. Spikelets 2-fld, narrow; in a spiciform panicle, persistent on the short pedicels. Glumes 5, I and II herbaceous, empty, persistent, acute or mucronate; I small, 1-nerved; II longest, 3-nerved, III and IV very short, keeled, hairy, 2-fld, with a

dorsal bent awn; V fig., minute, hyaline, broad, obtuse, glabrous, awnless, 5-7-nerved; palea narrow. 1-nerved. Lodicules 0. Anthers 2, large. Ovary glabrous; styles long. Grain terete, acute, free within the shining gl. and palea.—Species 4 or 5, native of temperate regions.

A. ODORATUM, Linn. Sp. Pl. 28; Kunth Enum. Pl. i. 38, Suppl. 28, t. 8; Host Gram. Austr. t. 5; Fl. Dan. 666; Reichb. Ic. Fl. Germ. 106; T. Nees Gen. Fl. Germ. Monocot. i. t. 16; Knapp. Gram. Brit. t. 1; Engl. Bot. t. 647; Trin. Sp. Gram. Ic. t. 14; Ledeb. Fl. Ross. iv. 408; Boiss. Fl. Orient. v. 470.

Occasionally found in the Hill districts of INDIA, but only as introduced by

man or as an escape from cultivation.—Native of Europe and N. Asia.

Perennial, sweet-scented, especially when dry. Stem 6-18 in., tufted, erect or ascending. Leaves flat, hairy. Paniels 1-5 in., pubescent or villous. Spikelets 1-1 in., fascicled, sometimes squarrosely, green; gl. I ovate, acute; II lanceolate; III and IV curved, obliquely truncate.—The glumes are often described as 6. The sixth, though 1-nerved, is, I think a palea, analogous to the 1-nerved pales of Hierochloa and of a few other grasses, the nerves being theoretically formed of two confluent ones.

58. HIEROCHLOA. Gmel.

Perennial, erect, sweet-scented grasses. Leaves flat. Spikelets 1-3-fld., laterally compressed, panicled, not jointed or their pedicels, rachilla not produced above gl. V. Glumes 5; I and II equal or unequal, 1-3-nerved, hyaline or scarious, shining, keeled; III and IV usually similar, awned, 2-3-androus or neuter; palea 2-nerved or 0; V fem. or bisexual, palea 1-(rarely 2-) nerved. Lodicules 2, small. Anthers linear. Styles free. Grain oblong, free within the gls.—Species 8-10, of temp. and cold regions.

- * Panicle effuse. Spikelets long-pedicelled; gl. III IV and V hirsute and ciliate, III and IV paleate, palea narrow, male; V smaller; rachilla produced between the gls.
- 1. H. laxa, Br. in Wall. Cat. n. 3796; leaves ensiform acute, spikelets in long, gl. I and II equal or subequal faintly nerved, III and IV truucate very shortly awned, V hirsute above the middle not awned. Duthie Grass. N.W. Ind. 25.

WESTERN HIMALAYA, from Kashmir, alt. 10-12,000 ft., to Kumaon, alt. 12-16,000 ft.

- Stem 1-2 ft., ascending from a stout creeping rootstock. Leanes 6-10 by \(\frac{1}{2}\)-\frac{1}{2} in., quite smooth; ligule large, oblong. Panicle 3-5 in., lax, oblong, inclined; branches solitary or geninate and pedicels capillary. Spikelets much compressed, brown; gl. I 1-nerved; II faintly 3-nerved; IV sometimes fem. and diandrous; palea of V sometimes distinctly 2-nerved, but usually 1-nerved, more or less hispid.
- 2. **M. fiexuosa**, *Hook. f.*; leaves narrowly linear, spikelets 1 in. long, gl. I and II subequal acuminate 3-nerved, III 2-toothed very shortly awned, III acutely 2-fid awn longer than the gl., IV not awned villous in the upper half, palea 1-nerved.

SIKKIM HIMALAYA; Bijean, King's Collector.

Stem 2-2½ ft., erect, very slender. Leaves about ½ in. broad; ligule oblong. Panicle 2-3 in. long and broad, very lax-fld.; rachis branches and pedicels all capillary and flexuous. Spikelets much compressed, brown; gl. I and II lanceo-

late, III and IV with a ring of hairs on the callus; V 5-nerved; palea 2-toothed, hairy above the middle.

- ** Panicle contracted. Spikelets shortly pedicelled or sessile; gls. III and IV hirsute, paleate or epaleate, male or neuter; V much smaller, convolute, ovoid, glabrous, its palea linear, concave, 1-nerved; rachilla not produced between gl. II and IV.
- 3. **H. Hookeri**, Clarke mss.; spikelets $\frac{1}{4}-\frac{1}{3}$ in. long ovoid, gl. I and II very unequal acuminate, III shortly 2-fid shortly awned in the sinus paleate male, IV almost 2-partite epaleate neuter, segments lanceolate acute, awn in the sinus twice as long as the gl.—Ataxia Hookeri, Griseb. in Goett. Nachr. (1868) 77.

E. NEPAL and SIKKIM HIMALAYA; in marshes, alt. 9-11,000 ft., J. D. H., Gammie.

Stem 6 in. 2 ft., erect, ascending or geniculate below, sometimes as thick as a crow-quill. Leaves long, narrow, smooth; ligule oblong. Panicle 5-7 in. long; branches erect, subsecund; pedicels very short. Spikelets greenish; gl. I 1-nerved; II 3-nerved; III and IV sessile; V stipitate, thiuly coriaceous, subacute.

4. **H.** gracillima, Hook. f.; very slender, panicle small, spikelets $\frac{1}{8}-\frac{1}{6}$ in. gl. I and II very unequal, III and IV epalente neuter, III shortly bifid awn in the sinus very short, IV tip obtusely 2-toothed, awn nearly basal twice as long as the gl., palea of V 1-nerved.

SIKKIM HIMALAYA, alt. 10-11,000 ft., J. D. H.

A much more slender grass than H. Hookeri, with short very narrow leaves 2-4 in. long, narrowed from the base to the tip. Paniele 1½-2 ip. long, drooping; rachis flexuous; branches very short and few-fld. Spikelets yellow or purplish, very shortly pedicelled.

5. **III.** khasiana, Clarke mss.; slender, panicle very narrow, spikelets $\frac{1}{8}$ in. long ovoid, gl. I and II subequal acuminate, III and IV epaleate neuter, III 2-fid to the middle, awn in the sinus as long as the gl. or shorter, IV 2-fid to the middle awn exceeding the gl.

KHASIA HILLS, alt. 4500-6000 ft., Clarke.

Stem 1-2 ft., ascending from a shortly creeping base. Leaves 4-6 by 1-1 in., tapering from the base to the tip; ligule oblong. Paniole 1-4 in., very narrow; branches short, erect, few-fid. Spikelets greenish-brown, erect.

6. **M. Clarkei**, *Hook. f.*; tall, sleuder, panicle very narrow, spikelets in long oblong, gl. I and II very unequal ovate-oblong acute, III shortly 2-fid shortly awned in the sinus paleate neuter, IV bifid to below the middle epaleate neuter, awn in the sinus twice as long as the gl.

KHASIA HILLS, at Lailan Kote, alt. 5500 ft., Clarke.

Stem 2 ft., slender, geniculate below. Leaves 6-8 by $\frac{1}{6}-\frac{1}{4}$ in., narrowed from the base to the tip; ligule short. Paniele as in H. khasiana, but spikelets nearly twice as large and narrower in proportion, and gl. IV with a long exserted awn.

Tribe VI. AGROSTIDEM. (See p. 5.)

59. ARISTIDA, Linn.

Annual or perennial grasses. Leaves usually convolute. Spikelets panicled, 1-fid., rachilla (or callus of fi. gl.) articulate at the base. Glumes 3, I and II empty, very narrow, keeled, persistent; III narrow, rigid,

cylindric, convolute, acuminate, tip produced into a long 3-partite (very rarely simple) naked or feathery awn twisted below the branches; palea very narrow, embraced by the gl., sometimes minute or 0. Lodicules 2. Stamens 3. Styles distinct. Grain narrow, free within the closely convolute gl.—Species (assumed) about 100, natives of warm countries.

The species and synonymy as given below have been revised by Dr. Stapf with the Oriental and African.

- Sect. I. CHETARIA. Aun tripartite from the base, not or imperfectly articulate with the top of the gl., persistent, glabrous.
- 1. A. Cumingiana, Trin. & Rupr. in Mem. Acad Petersb. Ser. VI. vii. (1849) 134; annual, dwarf, panicle very slender, spikelets (without the awns) $\frac{1}{12} \frac{1}{10}$ in., awn inarticulate at the base. Steud. Syn. Gram. 140; Mig. Fl. Ind. Bat. iii. 381; Hance in Journ. Linn. Soc. xiii. (1873) 135. A. capillacea, Cav. Ic. v. 43, t. 468, f. 1 (non Lamk.); Steud. l. c. 134. A. delicatula, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 293; Steud. l. c. 139. A. tenella, Kurz in Herb. Calcutt. A. trichodes, Walp. Ann. iii. 753; Miq. l. c. 380; Steud. l. c. 140. Chætaria trichodes, Nees in Hook. Kew Journ. ii. (1850) 101.

W. BENGAL, Kurs. CHOTA NAGPORE, Clarke. PRGU, Kurs; on the Shan

Hills, Collett.—DISTRIB. China, Philippines, Afr. trop.

Stem 3-10 in., tufted, very slender. Leaves filiform. Panicle subcylindric, narrow, loosely branched, rachis branches and pedicels capillary, scaberulous. Spikelets green or purplish; gls. acuminate, II longest; III as long as I, scaberulous; arms of awn twice as long as the gls., capillary, median longest.

2. A. Adscenscionis, Linn. Sp. Pl. 82 (excl. Syn. Sloane); annual or perennial, panicle contracted, branches short or elongate and naked below, spikelets (excl. awns) \(\frac{1}{2}\)-\(\frac{1}{2}\) in. acute, gl. I acuminate not awned, II obtuse or emarginate and mucronate, awn inarticulate at the base. Kunth Enum. Pl. i. 190; Steud. Syn. Gram. 139.

Throughout the Plains and low Hills of India, Burma and Ceylon,

ascending to 8000 ft. in Kashmir.—DISTRIB. Most warm countries.

Stems 6 in. —3 ft., tufted, usually almost filiform, rarely as thick as a crow-quill, smooth. Leaves very narrow, smooth or scaberulous. Paniels 3-12 in., subsimple or compound, rachis and capillary branches nearly smooth; branches very short with subsessile fascicles of spikelets, or longer, and erect or spreading. Spikelets pale green or purplish; gl. I + in., acute; II + in., tip truncate mucronulate; III - in., smooth or scabrid; middle branch of awn - in., rarely 1 in.

Dr. Stapf, who has reviewed the whole genus, informs me that besides the following synonyms, which apply to Old World forms, there are in the New World 11 others

under Aristida, and 14 under Chataria.

Var. typica, Stapf. mss.; gl. III about as long as II. A. abyssinica, Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii. (1849) 134. A. cærulescens, Desf. Fl. Atlant. i. 109, t. 21, f. 2; Kunth l. c. 191, Suppl. 146; Steud. l. c. 198. Boiss. Fl. Orient. v. 491; Duthie Grass. N.W. Ind. 26. A. canariensis, Villd. Enum. Pl. 99. A. chsetophylla, modatica, simplicissima & Teneriffs, Steud. l. c. 139, 420. A. curvata, Nees es A. Rich. Tent. Fl. Abyss. ii. 392. A. depressa, Rets. Obs. iv. 22; Roxb. Fl. Ind. i. 351; Wall. Cat. n. 3786; Kunth. l. c. 190, Suppl. 146; Thw. Enum. Pl. Zeyl. 370; Trim. Cat. Ceyl. Pl. 108; Dals. & Gibs. Bomb. Fl. 295; Aitch. Cat. Panjab Pl. 164 (evcl. Syn. setacea); Benth. Fl. Austral. vii. 563; Duthie l. c. & Fodd. Grass. N. Ind. 47, t. 30. A. divaricata, Jacq. Eclog. Gram. 7, t. 6 (non Willd.). A. elatior, Cav. Ic. vi. 65, t. 589, f. 1; Kunth l. c. i. 191. A. festucoides, Hochst. et Steud. ex Trin. & Rupr. (non Poir.). A.

gigantea, Linn. f. Suppl. 113; Kunth l. c. 194, Suppl. 150. A. Jacquiniana, Tausch. in Flora (1836) 508. A. Heymannii, Regel in Act. Hort. Petrop. vii. (1880) 649. A. Hystrix, Duthic Fodd. Grass. N. Ind. 47, t. 31 (n.t of Linn. ft). A. nutans, Willd. Hort. Berol. ex Steud. Nomenct. Ed. II. i. 131. A. paniculata; Forsk. Fl. Æg. Arab. 25 (ex descript.). A. pusilla, Trin. et Rupr. in Mem. Acad. Petersb. Ser. VI. vii. (1849) 140. A. setacca, Trin. l. c. i. (1831) 84 (non Retz.); Wall. Cat. n. 3785; Steud. l. c. 139. A. vulgaris, Trin. & Rupr. in Mem. Acad. Petersb. l. c. 131 (with 10 vars.) Steud. l. c. 138. Chætaria Ascenscionis, cærulescens, canariensis, depressa, elatior, & gigantea, Beauv. Agrost. 30. C. curvata & mauritians, Nees Fl. Afr. Austr. 186, 188. C. Hystrix, Wight Cat. n. 1787 (non Beauv.).

Var. A. æthiopica, Trin. & Rupr. l.c. 167. A. Ehrenbergii, Trin. & Rupr. Stipac. 136; Steud. l.c. 138. A. festucoides, Poir. Encycl. Suppl. i. 453 (ex Trin.); Kunth Enum. Pl. i. 197. A. mutabilis, var. æquilongs, Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii. (1849) 150. A. pumila, Done in Ann. Sc. Nat. Ser. II. iv. (1835) 85; Boiss. l.c. 496; Steud. l.c. 138. A. spicigera, Trin. & Rupr. l.c. in part (with 6 vars.).

-Aristida Wall. Cat. n. 3788.

3. A. setacea, Retz. Obs. iv. 22; perennial, panicle contracted, spikelets (excl. awn) ½-3 in., gl. I and II long-awned, awn inarticulate at the base, middle branch ½-1½ in. Kunth Enum. Pl. i. 191 (excl. Syn. depressa), Suppl. 148; Steud. Syn. Gram. 141; Roxb. Fl. Ind. i. 349; Wall. Cat. n. 3785 A. B in part); Grah. Cat. Bomb. Pl. 218; Dalz. & Gibs. Bomb. Fl. 295; Duthie Grass. N.W. Ind. 27. A. adscendens, Trim. Cat. Ceyl. Pl. 108. A. arundinacea, Roem. ex Retz. l. c. (non Linn.). A. cœrulescens, Thw. Enum. Pl. Zeyl. 370. A. Hystrix, Baker Fl. Maurit. 451 (excl. Syn.). A. quinquesets, Steud. l. c. 420. Chætaria setacea, Beauv. Agrost. 36. C. depressa, Herb. Wight propr. n. 1735.

WESTERN INDIA; from Behar and the Concan southwd. CEYLON; Walker,

&c.—DISTRIB. Mascarene Islds.

Stem 3-4 ft., sometimes as thick at the base as a goose-quill, stout, erect, simple, or subfastigiately branched with open sheaths at the ramifications. Leaves filiform, convolute, scaberulous. Paniels 6-12 in., inclined; branches short, subsecund, scaberulous, usually fascicled and erect. Spikelets green or purplish; gl. I narrowed into a short awn; 2 minutely 2-toothed, awn short; III nearly smooth; beard of callus copious, white, silky.

4. A. cyanantha, Steud. Nom. Ed. II. i. 131; Syn. Gram. 141; tall stout, panicle effuse, branches flexuous widely spreading, spikelets (excl. awns) \$\frac{1}{2}\$-\frac{1}{2}\$ in., gls. I and II shortly awned, awn of III not articulate with the gl. branches very long flexuous middle one up to 2\frac{1}{2}\$ in. Trin. in Act. Acad. Sc. Petrop. Ser. VI. v. (1842) 150; Boiss. Fl. Orient v. 492; Duthie Grass. N.W. Ind. 26 (excl. Syn.). Chaetaria cyanantha, Nees in Royle Ill. Bot. Himal. 424.

WESTERN HIMALAYA, alt. 3-5000 ft., from Kashmir to Kumaon; and low hills of the Panjab.—Distrib. Afighanistan.

Perennial. Stem 3-6 ft., attaining the thickness of a swan's quill below. Leaves 6-12 by \(\frac{1}{3}\)-\(\frac{1}{2}\) in., at length convolute, quite smooth, glaucous; sheaths smooth. Panicle 12-18 in., very variable in amount of branching; branches 4-12 in., solitary or 2-3-nate, usually naked for 2-6 in., scaberulous. Spikelets usually dark purple; gls. I and II with nearly smooth keels, tip of II fimbriately toothed; III, callus hairs very few; awn minutely scaberulous.

5. A. Hystrix, Linn. f. Suppl. 113; perennial, panicle as broad as long branches distant rigid widely spreading, spikelets (excl. awns) \(\frac{1}{4}\)-\(\frac{1}{4}\) in.,

gls. I and II. finely acuminate or awned, awn of III not articulate with the gl. branches very long rigidly flexuous middle one 1-2 in. Trin. Diss. i. 187, in Act. Petrop. (1829) 83, (1836) 47; Kunth Enum. Pl. i. 350, Suppl. 147; Roxb. Fl., Ind. i. 350; Wall. Cat. n. 3784; Grah. Cat. Bomb. Pl. 335; Dalz. & Gibs. Bomb. Fl. 295; Steud. Syn. Gram. 141. A. tripilis, Thunb. Fl. Ceyl. Diss. 2, ex Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii. (1849) 147. Chaetaria Hystrix, Beauv. Agrost. 30.

The DECCAN PENINSULA, from the Concan and Central Provinces southward.

CRYLON (Thunberg).

Stem 6 in.-2 ft., as thick as a crow-quill or less, stiff, stout and erect or long inclined or prostrate and proliferously branched with open sheaths at the ramifications. Leaves 2-4 in., narrow, convolute, glaucous. Panicle 4-6 in.; rachis stout flexuous and angular, branches and branchlets smooth. Spikelets straw-colrd.; gls. I and II membranous or subchartaceous, keels smooth; II most minutely toothed at the base of the awn; III smooth, callus naked, awns most minutely scaberulous.— I have seen no Coylon specimens, for which habitat Thunberg (fid. Trinius) is the authority.

6. A. mutabilis, Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii. (1849) 150 (excl. var. requilonga); annual, panicle very narrow subcylindric, branches very short crowded, spikelets (excl. awns) \(\frac{1}{4}\) in., gls. I and II shortly awned, awn of III obscurely articulate with the gl., column long, branches rather short, middle one about \(\frac{1}{4}\) in. Steud. Syn. Gram. 141. A. articulata, Edgew. in Journ. Linn. Soc. vi. (1862) 209; Aitch. Cat. Panjab Pl. 164; Duthie Grass. N. W. Ind. 26, Fodd. Grass. N. Ind. 47. A. Kunthiana & meccana, Trin. & Rupr. l. c. 151 (ex descr.) 152; Steud. l. c. 141. A. Schweinfurthii, Boiss. Fl. Orient. v. 493. A. spicata, Rottl. mss. A. tenuis, Hochst in Flora, xxviii. (1855) 200.

The PANJAB & RAJPOOTANA; Multan, Edgeworth; Jodhpore, King. SOUTHEBN

INDIA, Heyne, Wight, &c .- DISTRIB. Arabia, Africa trop.

Stems 6-12 in., many ascending from the root, simple or proliferously branched, slender. Leaves 1-3 in., very slender, curved, convolute, rigid, smooth. Panicle 3-6 in., branches all very short and crowded, or with sometimes a few remote lower down or the stem ascending from a naked base and bearing a dense oblong fascicle of spikelets, rachis smooth, branches scaberulous. Spikelets very shortly pedicelled, pale green or straw-colrd.; gl. I \(\frac{1}{2} \) in., keel scaberulous; II \(\frac{1}{2} \) in., tip 2-toothed below the awn; III scaberulous, callus shortly bearded; column of awn nearly as long as the gl., slender, smooth, branches capillary.—King's specimens from Jodhpore are in a starved state and mixed with A. Adscenscionis.

Sect. II. ARTHRATHERUM. Column of awn long, twisted, articulate on the glume (obscurely in A. redacta), branches glabrous, rarely 0.

7. A. funiculata, Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii. (1849) 159; annual, very slender, panicle lax narrow, branches very short, gls. I and II \(\frac{1}{4}\)—1 in. subequal awned, column of awn I in. or less, branches capillary 1-3 in. Steud. Syn. Gram. 142; Aitchis. Cat. Panjab Pl. 164; Boiss. Fl. Orient. v. 492 (in part); Duthie Fodd. Grass. N. Ind. 47. A. funicularis, Trin. ex Steud. Nomencl. Ed. II. i. 131; Edgew. in Journ. As. Soc. Beng. xxi. (1852) 160, 163 (tenicularis). A. Kotschyi, Hochst. ex Steud. Syn. Gram. 142. A. macrathera, A. Rich. Tent. Fl. Abyss. ii. 393; Steud. l. c. 142; Boiss. l. c. 493 (macranthera). A. mallica, Edgew. in Journ. Linn. Soc. vi. (1862) 209; Aitch. l. c.; Duthie l. l. c. c. c. A. murina, Aitchis. l.c. 164 (non Cav.); Duthie Grass. N.W. Ind. 26. A. paradoxa, Schmidt Fl. Cap. Verd. 140. A. pilosa, Herb. Heyne (non Labill.). A. Royleana, Trin. & Rupr. in Mem. Acad. Petersb.

VI. vii. (1849) 160; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1892) 358. A. stipacea, Ehrenb. & Hempr. ex Trin. & Rupr. l. c. Chaetaria murina, Nees ex Trin. & Rupr. l. c. 160. C. murina, \(\beta \). villosa, Nees ex Wight Cut. n. 1736. C. Royleana, Nees ex Steud. Syn. Gram. 143. Arthratherum Kotschyi, Hochst. ex Trin. l. c.—Aristida, Wall. Cat. n. 3787.

Plains of the PANJAB from the Sutlej westward. RAJPOOTANA, and from the

CONCAN southward.—DISTBIB. Beluchistan, Arabia, Trop. Africa.

Stems many, geniculately ascending, 10 in.-2 ft. Leaves very slender, flat or convolute, base ciliate with long hairs. Paniele 4-10 in., branches erect capillary. Spikelets variable in length, pale; gl. I rather shorter than II, keels scaberulous; III smooth, callus sparsely bearded or naked; column of awn very slender, minutely scaberulous, twisted, branches straight capillary.

Var. Royleana, leaves eciliate, spikelets smaller, on more distant spreading flexuous branches, gl. I \(\frac{1}{2} \) in. or less, column of awn \(\frac{1}{2} \) in., branches more unequal, longest \(\frac{3}{2} \) in.—A. Royleana, Trin. \(\frac{3}{2} \) Rupr. \(l. c. 160 \); Steud. \(l. c. 143 \). Chaetaria Royleana, Nees ex Steud. \(l. c. \) Arthratherum Royleanum, \(Edgew. ex Aitchis. l. c. \)

- The Panjab, Kangra, alt. 3000 ft., Clarke. Var. ? Stocksii; gl. I = ½ II.—Concan? Herb. Stocks.

8. A. hystricula, Edgew. in Journ. Linn. Soc. vi. (1862) 208; dwarf, very slender, 1-2 in. high, panicle very small narrow much shorter than the awns, gls. I and II $\frac{1}{3}$ in. subequal or I shorter aristately acuminate, column of awn $\frac{1}{4}$ in. twisted, branches subequal $\frac{1}{3}-\frac{2}{3}$ in. Aitchis. Cat. Panjab Pl. 164; Duthie Grass. N.W. Ind. 26, Fodd. Grass. N. Ind. 47. A. funiculata, Boiss. Fl. Orient. v. 493 (the Beluchist plant only).

The Panjab; Multan, Edgeworth. Scind; near Kurrachee, Stocks.—Distrib. Beluchistan.

Annual. Stems very many from the root, \(\frac{1}{2}\)-1 in., densely crowded. Leaves subulate, curved, convolute, acuminate, glabrous. Paniele without the awns \(\frac{1}{2}\)-1 in.; branches few, short, erect. Spikelets erect; gls. I and II very narrow; callus of III minute, glabrous; column of awn capillary, twisted, smooth, branches of extreme tenuity.

9. A. redacta, Stapf in Kew Bullet. (1892) 85; stems tufted, tall or short, panicle large effuse, branches spreading, gls. I and II subequal shortly awned about ½ in. long, II deciduous, column of awn capillary twisted. branches 0 or very short. A. depressa, Retz. Herb. Ind. Or. Hf. & T. in part. Stipa aristoides, Stapf ex Lisbou in Journ. Bomb. Nat. Hist. Soc. vii. (1892) 358.

LOWER BENGAL; Burdwan, Clarke. The CONCAN, CENTRAL INDIA, and the

CENTRAL PROVINCES, Stocks, Law, &c. - DISTRIB. S. Persia.

Annual. Stems 6 in.-2 ft., rather stout or slender, densely tufted, simple, or proliferously branched in robust specimens. Leaves 4-8 in., very slender, convolute, ciliate with long hairs at the base. Panicle 6-12 in., rachis slender smooth; branches usually binate, capillary, flexuous, smooth, erect or spreading, each with one or few spikelets. Spikelets on short or long capillary pedicels, greeu or purplish; column of awn gradually dilating below, 3-nerved, convolute and passing into the glume from the top of which it separates readily but without an indication of the joint.

Sect. III. STIPAGROSTIS. Awn feathery.

10. A. hirtigluma, Steud. Nom. Ed. II. ii. 231, Syn. Gram. 144; very slender, panicle narrow strict or flexuous, branches very short, gl. I and II unequal, III muriculate, awn capillary plumose middle branch 1½ in. lateral much shorter naked of extreme tenuity. Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. v. (1842) 171; Aitchis. Cat. Panjab Pl. 164;

Duthie Grass. N.W. Ind. 26, Fodd. Grass. N. Ind. 47; Boiss. Fl. Orient. v. 496. A. ciliata, Steud. & Hochst. ex Steud. Nom. Ed. II. i. 131 (non Desf.). A. decorata, Steud. Syn. Gram. 421. A. paradisea, Edgew. in Journ. As. Soc. Beng. xvi. (1847) ii. 1219. A. pogonoptila, Boiss. l. c. A. Schimperi, Hochst. et Steud. ex Steud. l. c. 143. Arthratherum ciliatum, Nees in Linnwa, vii. (1832) 287, Fl. Afr. Austr. i. 182. Arth. etatum, Boiss. Diagn. Ser. II. iv. 128. Arth. hirtiglume & pogonoptilum, Jaub. & Spach, Ill. Pl. Orient. iv. 52, 56. Arth. Schimperi, Nees Fl. Afr. Austr. 178.

The PANJAB, Jacquemont, Falconer, &c. PESHAWUB, &c., Stewart. SCIND,

Herb. Calcutt. - DISTRIB. Westward to Egypt and Abyssinia.

Perennial. Stem stout at the base, slender and 1-2 ft. high. Leaves 3-8 in., convolute, filiform, flexuous, tips capillary. Panicle very slender, branches very short, erect, capillary. Spikelets pale green or straw-colrd.; gls. I and II got or hardly awned, hairy or glabrous; I \(\frac{1}{2}\) in.; II rather shorter; III muriculate, callus bearded; awn straight, articulate in the gl., column twisted, plumose as well as the middle branch.

11. A. plumosa, Linn. Sp. Pl. Ed. II. 1666; stem slender, panicle narrow, branches very short, gls. I and II subequal, III glabrous smooth, awn capillary middle branch 2-3 in. plumose above naked below, lateral much shorter naked of extreme tenuity. Vahl Symb. i. 11, t. 3; Trin. Diss. i. 181, ii. 26; in Act. Petrop. (1829) 89; Trin. & Rupr. l. c. Ser. VI. v. (1842) 165; Kunth Enum. Pl. i. 195, ii. 151; Steud. Syn. Gram. 143; Aitchis. Cat. Panjab Pl. 164; Boiss. Fl. Orient. v. 495; Duthie Grass. N.W. Ind. 26, Fodd. Grass. N. Ind. 47. A. brachypoda & Forskahlii, Tausch. in Flora (1836) 506; Boiss. l.c. 495, 496. A. lanata, Forsk. Fl. Ægypt. Arab. 25. A. Raddiana, Savi in Mem. Moden. (1837) 198; Steud. l.c. 144, Arthratherum plumosum, Nees Fl. Afr. Austr. i. 182.

WESTERN TIBET; Iskardo, alt. 7700 ft., Clarks.—Distrib. Turkestan, Persia, N. Africa.

Perennial. Stem 1-2 ft., from a stout branching woody stock with stout rigid roots. Leaves 2-6 in., rigid, flifform, convolute, firxuous. Paniole 2-3 in. (excl. the awns) very narrow. Spikelets erect; gls. I and II \(\frac{1}{2}\) in., not awned; III callus bearded, column of awn \(\frac{1}{2}\) in., very slender, hardly twisted, glabrous; middle branch strict, silvery, lower \(\frac{1}{2}\) naked, lateral about \(\frac{1}{2}\) in. long.

UNDETERMINABLE SPECIES.

A. RIGNESCENS, Roem. & Schult. Syst. ii. 400; Stoud. Syn. Gram. 141. A. rigida, Heyne ex Roth. Nov. Sp. 42 (non Cav.); Kunth Enum. Pl. i. 197. Arthratherum rigidum, Schult. Mant. ii. 212).—May be A. Hystrix.

60. STIPA, Linn.

Tufted perennial grasses. Leaves usually convolute. Spikelets loosely panicled, terete, 1-fid., rarely dorsally compressed, rachilla forming a thickened or narrow callus below gl. III. Glumes 3, I and II empty, persistent, keeled, acute, rarely awned; III rigid, convolute, terete, narrowed into an entire or notched or 2-fid tip, with a long terminal bent usually deciduous awn, column of awn twisted rarely straight; palea 2-nerved, closely embraced by the gl. Lodicules 3, large. Stamens 1-3, tips of anther-cells bearded or naked. Grain narrow, terete, free within but tightly embraced by the gl. and palea.—Sp. about 100, temperate and tropical.

Dr. Stapf has aided me greatly in this difficult genus.

- A. Column of awn twisted.
- * Awn plumose or hairy throughout its length or nearly so.
- 1. S. orientalis, Trin. ex Ledeb. Fl. Alt. i. 83; panicle narrow more or less embraced by the dilated sheath of the uppermost leaf, spikelets \(\frac{1}{2} \) in., gls. I and II about twice as long as the silkily hairy III. Ledeb. Ic. Fl. Ross. t. 223; Trin. in Act. Acad. Petersb. VI. i. (1830) 79; Kunth Enum. Pl. i. 185; Steud. Syn. Gram. 131; Boiss. Fl. Orient. v. 504; Duthie Grass. N.W. Ind. 27. S. Semenovii, Krassn. Descr. Pl. Thiansch. in Script. Bot. Hort. Univ. Petrop. ii. 22. S. Szovitziana, Duthie l. c. 27 (non Trin.). S. tartarica, Jacquem. mss.

WESTERN TIBET, alt. 10-15,000 ft., Jacquemont, &c.—DISTRIE. Westward to Persia. Altai Mts.

Stems 6-14 in., forming dense hard tufts, clothed below with shining sheaths. Leaves 4-10 in., filiform, tips long capillary; sheath of uppermost, 4-6 by \$\frac{1}{2}\$ in. broad. Pasicle elongste, branches and pedicels short, erect. Gls. I and II hyaline, \$\frac{1}{2}\$-\$\frac{1}{2}\$ in. long, tips slender; I 1-nerved or 3-nerved at the base; II 3-nerved; III cylindric, callus = about \$\frac{1}{2}\$ of the gl., bearded; awn plumose throughout its length, nearly straight, column about \$\frac{1}{2}\$ of its length.—Probably a form of S. barbata. Said to be the commonest grass on the Pamir.

2. S. basi-plumosa, Munro mes.; panicle very narrow, branches and pedicels very short, spikelets purple, gl. I and II \(\frac{1}{2}-\frac{1}{2}\) in., III about \(\frac{1}{2}\) shorter than II sparsely hairy, awn capillary twice or thrice as long as the spikelet very densely bearded towards the base.

WESTERN TIBET; Nubra, and the Lanak Pass, alt. 15-17,000 ft., Thomson.

Stems 6-16 in., densely tufted, slender, strict. Leaves 4-6 in., convolute, filiform, slightly scabrid. Panicle 2-6 in., sometimes sheathed; branches and spikelets distant; gl. I and II ovate-lanceolate finely accuminate, tip and margins white hyaline; I 3-nerved at the base; II 3-nerved; callus of IV = about \(\frac{1}{2} \) of the gl.; awn very delicately plumose upwards with spreading hairs, column slightly twisted.

Var. longe-asistato, Munro mss.; gl. I and II \(\frac{1}{2} \) in., awn 1\(\frac{1}{4} \) in.—Western Tibet, Thomson.

3. S. purpurea, Griseb. in Goett. Nachr. (1868) 82; spikelets few purple on long capillary sigmoidly flexuous pedicels, gl. I and II 3-1 in., III about 1 shorter than II softly hairy, awn 21-3 in. flexuous. S. Richteriana, Herb. Ind. Or. Hf. T.; Duthie Grass. N.W. Ind. 27 (not Kar. & Kir.). Lasiagrostis tremula, Ruprecht Sert. Thiansch. 35.

WESTERN TIBET; Gnari Khorsum, alt. 17,000 ft., Schlagintweit; Lake Bukshun, 15,000 ft., Lance.—Distrib. Thianschal Mts., in Central Tibet, alt. 16,000 ft., Thorold.

Stems densely tufted, 6-10 in., filiform, sheathed below the panicle. Leaves 2-4 in., filiform, convolute; ligule elongate. Spikelets very few, hardly forming a panicle, branches and pedicels \(\frac{1}{2} \) in. or more, sometimes zigzag. Gls. I and II narrowly lanceolate, dark purple with slender hysline tips; III callus = \(\frac{1}{2} \) of the gl., villous. Anther-tips naked.

4. S. mongolica, Turcz. ex Trin. in Rull. Sc. Acad. Petersb. i. (1836) 67; panicle open with few distant widely spreading capillary flexuous branches, spikelets \(\frac{1}{4} \) in. ovate dorsally compressed, gls. I and II purple below the middle hyaline above it, III hairy, awn about twice as long as the gls. Steud. Syn. Gram 182; Duthie Grass. N.W. Ind. 27. Lasiagrostis mongholica, Trin. ex Rupr. in Mem. Acad. Petersb. Ser. VI. Sc.

Nat. v. (1842) 87. L. alpina, F. Schmidt Reise Amurl. 73. Ptilagrostis mongholica, Griseb, in Ledeb, Fl. Ross, iv. 447, in Goett, Nachr. (1868) 82.

ALPINE HIMALAYA; Kumaon, alt. 14,000 ft., Strackey & Winterbottom. N. Sikkim, alt. 14-16,000 ft., J. D. H. WESTERN TIBET; Ladak, alt. 13,000 ft.,

Thomson, Lance.—DISTRIB. Altai Mts. Mongolia.

Stems 1-2 ft., densely tufted, very slender. Leaves 4-6 in., almost capillary, flexuous. Panicle 4-6 in., branches solitary, lower 1-3 branching at the ends. Spikelets ovoid, pedicels 1 in.; gls. I and II oblong-lanceolate, acute; I 1-nerved or 3-nerved below; II nerves 3, very slender; III about & shorter than II, hairy all over; awn twice as long as the spikelets or more, hairy to the tip. Anther-cells with bearded tips.

5. S. concinna, Hook. f.; panicle small few-fid. contracted, branches and pedicels short erect, spikelets 1 in. ovoid dorsally compressed purple, gls. I and II ovate acute tips hyaline, III glabrous, awn about twice as long as its gl.

SIKKIM HIMALAYA, in the Tibetan Region, alt. 14-16,000 ft., J. D. H.

Stem 6-10 in., rather stout. Leaves 2-4 in., filiform, flexuous. Panicle 1-1; in., solitary, branches and pedicels erect. Gl. I and II acuminate; I 1-nerved Il 3-nerved; awn hairy to the tip. Anther cells with bearded tips.

- ** Awn plumose above the column only.
- 6. S. pennata, Linn. Sp. Pl. 78; panicle narrow sheathed, gl. I and II subequal cuspidately awned, III = 1 II glabrous above, awn 6-9 in. flexuous plumose above the column only. Host Gram. Austr. iv. 19, t. 33; Engl. Bot. t. 1356; Trin. in Act. Petrop. (1829) 32; Trin. & Rupr. l. c. vii. (1842) 80; Kunth Enum. Pl. i. 179; Reichb. Ic. Fl. Germ. 46; T. Nees Gen. Fl. Germ. Monocot. i. n. 26; Ledeb. Fl. Ross. iv 450; Boiss. Fl. Orient. v. 502. S. aperta, appendiculata, gallica & tauricola, Janka ex Celak in Estr. Bot. Zeitschr xxxiii. (1883) 317, 319, 349. S. eriocaulis, Borb. in Estr. Bot: Zeitschr. xxxiii. (1883) 401. S. Grafiana, & Tirsa, Stev. in Bull. Soc. Nat. Mosc. xxx. ii. 115, 116. S. pulcherrima, C. Koch in Linnæa, xxi. (1848) 440.

WESTERN TIBET; Gilgit, alt. 9-10,000 ft., Giles. - DISTRIB. Westwd. to the Atlantic. N. Asia.

Stem 2-3 ft., densely tufted. Leaves 12-18 in., rigid, convolute, sheaths smooth or rough; ligule oblong. Panicle few-fld., branches short. Spikelets about 1 in. long; gl. I and II hyaline, tips almost capillary; III hirsute, callus 1 in. long; awn twisted and glabrous from the lower third.

- *** Awn glabrous or scaberulous, or hairy on the column only.
- + Tip of gl. III entire.
- 7. S. capillata, Linn. Sp. Pl. Ed. II. 116; panicle very narrow sheathed, spikelets 1 in., gl. II longer than I, III = about & II glabrous above, awn 6-8 in. flexuous smooth glabrous throughout. Host Gram. Austr. iii. 4, t. 5; Reichb. Ic. Fl. Germ. t. 46; Kunth Enum. Pl. i. 180, Suppl. 133; Trin. & Rupr. in Act. Petrop. Ser. VI. v. (1842) 72, t. 55; Ledeb. Fl. Ross. iv. 449; Steud. Syn. Gram. 130; Boiss. Fl. Orient. v. 500. S. capillaris, Gronov. ex Trantv. in Act. Hort. Petrop. ix. (1848) 350. S. erecta, Hort. Madr. ex Trin. Diss. i. 186, in Mem. Acad. Petersb. vi. I. (1829) 81. S. junces, Lamk. Illust. i. 157. S. Lagascae, Guss. Pl. Rar. 48, Fl. Sic.

Prodr. i. 132 (ex Bertol.). S. sareptana, Beck. in Bull. Soc. Nat. Mosc. lvii. (1882) 52. S. ukranica, Steud. Nom. Ed. I. 816. S. ukranensis, Lamk. l. c. S. Varonini, Krassn. in Script. Bot. Hort. Univ. Petrop. ii. 22.

WESTERN HIMALAYA; Kashmir, alt. 9-11,000 ft., Jacquemont, &c. - DISTRIB.

Westwd. to Spain. Dahuria. China.

Stem 2-3 ft., rather stout. Leaves 1-2 ft., filiform, convolute, scaberulous; ligule lanceolate. Panicle very narrow, more or less enclosed in a sheath, which is 6-10 in. long with a filiform blade often as long as itself; branches and pedicels short. Spikelets white, glistening, hyaline, gl. I and II very narrow, with finely acuminate tips; I 5-nerved below; II 5-nerved; III \(\frac{1}{4}\) in. long, nerves pubescent below, above and palea quite glabrous; callus nearly half as long as its gl., scabrid, top bearded. Anther cells with naked tips.—Dr. Stapf informs me that the N. America S. comata, Trin. & Rupr. might be referred here.

8. S. sibirica, Lamk. Illustr. i. 158; tall, leaves long flat, panicle elongate very narrow branches erect, spikelets \(\frac{3}{4}\)-\frac{1}{2}\) in. green lanceolate, gls. I and II oblong-lanceolate, III hairy, awn about twice as long as the spikelet rather stout hairy towards the base only. Kunth Enum. Pl. i. 185; Trin. in Act. Petrop. (1829) 78; Trin. \(\frac{9}{2}\) Rupr. l. c. 1842, 59; Ledeb. Fl. Ross. iv. 448, Ic. Fl. Ross. t. 99; Steud. Syn. Gram. 129; Boiss. Fl. Orient. v. 499; Duthie Fodd. Grass. N. Ind. 27. Avena sibirica, Linn. Sp. Pl. 79; Gmel. Fl. Sibir. i. t. 12.

WESTERN TEMPERATE HIMALAYA, from Kashmir to Kunawur, alt. 8-9000 ft., Falconer, &c.; Black Mts., Duthie.—DISTRIB. Affghan. Siberia to Korea.

Stem 2-3 ft., as thick as a duck's quill or more, simple or branched. Leaves 1-2 ft. by \(\frac{1}{2} \) in., smooth; ligule oblong. Panicle 6-12 in., inclined; branches erect and appressed, rarely spreading, scaberulous; pedicels usually shorter than the terete spikelet. Gls. I and II subhyaline, III nearly as long as II, terete or slightly dorsally flattened; palea as long as its gl., linear, obtuse, dorsally hairy; callus short, conical. Anther-tips bearded.

Var.? pallida; very slender, leaves filiform, spikelets \ \frac{1}{2}-\frac{1}{2}\ in. pale, gl. III half as long as II, awn capillary three to four times as long as the spikelet. S. pallida, Munro ex Duthis Grass. N.W. Ind. 27 (name). S. sibiica, Linn. var. Herb. Strachey & Winterbottom.—Tibet, N. of Kumaon, alt. 15,000 ft., Strack. &

Winterb .- The specimens are very scanty and want radical leaves.

9. S. tortilis, Desf. Fl. Atlant. i. 99, t. 31; annual, panicle partially sheathed dense-fid. almost spiciform, spikelets fascicled, gl. I and II subequal much longer than IV setaceously linear, III linear hairy or scabrid, awn 2-4 in. straight column only hairy, callus long acute. Trin. in Act. Petrop. (1829) 78, 185, Trin. & Rupr. l. c. VI. v. (1842) 64; Kunth Enum. Pl. i. 180; Steud. Syn. Gram. 130; Boiss. Fl. Orient v. 500. S. capensis, Nees Fl. Afr. Austr. i. 170. PThunb. Prodr. Pl. Afr. Austr. 109. S. humilis, Brot. Fl. Lusit. i. 86 (non Cav.). S. paleacea, Sibth. & Sm. Prodr. Fl. Græc. i. 65; Fl. Græc. i. t. 86 (non Vahl). S. seminuda, Vahl ex Hornem. Hort. Hafn. i. 76.

The Panjab; Peshawur and Wazuristan, Stewart.—Distrib. Westwd. to the Atlantic. S. Africa.

Siem very slender, tufted, 4-6 in. Leaves filiform. Panicle 1-4 in., sheath sometimes \(\frac{1}{2}\) in. broad or more. Spikelets \(\frac{3}{2}\)-1 in.; gl. I and II 3-nerved; callus of III = \(\frac{1}{2}\) of the gl. bearded at the top only; column of awn hairy throughout its length. Anthers with bearded tips.

++ Tip of gl. III 2-fid or 2-toothed.

10. **S. Jacquemontii,** Jaub. & Spach, Ill. Pl. Or. iv. 60, t. 639; leaves convolute filiform, panicle narrow rachis and lax-fid. branches filiform, spikelets 1 in. linear-lanceolate, gl. I and II subequal lanceolate acuminate, III half as long as II terete villous, awn capillary geniculate 3-4 times as long as the spikelet villous at the base. Lasiagrostis Jacquemontii, Munro ex Boiss. Fl. Orient. v. 506.

N. W. HIMALAYA; Kashmir, Astor, Tilail, &c., alt. 8-9000 ft., Jacquemont, &c. Western Tiber; Piti, Thomson.—Distrib. Affghanistan.

Stems densely tufted, erect, 10-18 in., very slender. Leaves 6-10 in., erect, subflexuous; ligule a very short membrane. Panicle 4-6 in. long, erect or slightly inclined, branches erect few-fld. Spikelets erect, green or purplish, pedicels rather shorter than the spikelets; gl. I and II 3 nerved; III } in., terete, villous all over; tip 2-toothed; awn 1-12 in. twisted below the knee; callus very short, conical, villously bearded; pales much shorter than the gl. Asther-tips bearded.

11. S. Duthiei, Hook. f.; tall, very slender, leaves very long and narrow, panicle long narrow few-fld., rachis and long pedicels capillary, spikelets 1 in., very narrow, gl. I and II subequal very narrowly lanceolate, III sparsely hairy, awn capillary nearly straight about twice as long as the spikelet.

WESTERN HIMALAYA; Garwhal, alt. 12-13,000 ft., Duthie (n. 278).

Stem 3-5 ft., tuited. Leaves 12-18 in. or more, 18-16 in. broad, flat, or the lower convolute; ligule large, oblong, obtuse. Panicle 8-10 in., branches bearing one or two erect spikelets at the extremity, lower branches 3 in. Spikelets pale, glistening; gl. I 3-nerved; II 5-nerved; III about } shorter than II, tip minutely 2-fid; awn & in., hairy at the twisted base; callus short, conical, oblique, bearded; palea nearly as long as the gl., glabrous. Anther-tips bearded.

12. S. Hookeri, Stapf in Journ. Linn. Soc. xxx. (1894) 121; tall, robust, leaves convolute, panicle oblong loosely branched, branches manyfld., spikelets 1-1 in. longer than their pedicels, gl. I and II subequal oblong-lanceolate acute minutely scaberulous, IV sparsely hairy or villous, awn about as long as the gl. scuberulous. S. robusta, Duthie Grass. N.W. Ind. 27 (name). Lasiagrostis robusta, Munro mss. ex Duthie l.c. (name).

WESTERN TIBET; in wet places, alt. 10-14,000 ft., Jacquemont; Nubra, Thomson. TIBETAN SIKKIM, alt. 15-16,000 ft., J. D. H.-DISTRIB. Central Tibet, alt. 14,800

ft., Thorold.

Stems 3-4 ft., densely tufted, as thick as a swan's quill at the base, hard, leafy upwards. Leaves 1-2 ft., smooth or scaberulous; ligule 1 in., oblong. Panicle 8-10 in., inclined; branches 2-4-nate, subserect, and rachis and pedicels smooth. Spikelets yellowish or purplish; gl. I broadest, 1-3-nerved; II 3-nerved; III rather shorter than II, terete, 5-uerved; awn more or less curved, slender, hardly twisted towards the base; palea nearly as long as the gl., hairy; callus small, conical, bearded. Anther-tips naked or minutely bearded.—In the specimen from Northern Sikkim the stem at the base is as thick as the thumb, the leaves and stems shorter, and panicle sometimes contracted oblong and dense-fid., the short branches crowded. and the spikelets very shortly pedicelled; their gl. III is deeply 2-fid, with equal or unequal seta ceous-pointed lobes.

- B. Column of awn not twisted. (See also S. Hookeri.)
- 13. S. splendens, Trin. in Spreng. Neue Entdeck. ii. 54; Diss. i. 183, in Act. Petrop. (1830) i. 76; tall, robust, leaves convolute, panicle

very large effuse or contracted, spikelets $\frac{1}{8}$ in. sessile or shortly pedicelled, gls. I and II oblong-lanceolate unequal, III tip 2-fid, awn $\frac{1}{4-\frac{1}{8}}$ in. Duthie Grass. N.W. Ind. 27; Steud. Syn. Gram. 132. S. altaica, Trin. ex Ledeb. Fl. Alt. i. 80, in Act. Acad. Petrop. 1829, 74; Ledeb. Ic. Fl. Ross. t. 222; Kunth Enum. Pl. i. 184. Lasiagrostis splendens, Kunth Revis. Gram. i. 58, Enum. Pl. i. 178; Trin. Sp. Gram. Ic. 89; Griseb. in Goett. Nachr. 82. Agrostis longiaristata, Herb. Ross. ex Kunth Enum. l. c.

WESTERN TIBET, alt. 8-12,000 ft., Falconer, &c .- DISTRIB. Siberia.

Stem 8-5 ft., as thick as a goose-quill below, yellow, shining; roots very stout, vermiform. Leaves 6-12 in., and sheaths smooth or scaberulous, acuminate, lower sheaths long loose; ligule elongate. Panicle 12-18 in., pyramidal when open; rachis slender, smooth; branches semi-verticillate, capillary, 4-10 in., simple below, branched above. Spikelets white or dull purplish; gl. I and II subacute; I 1-nerved; II longest, 3-nerved, III and palea villous; callus short, conical; awn ½-½ in., not twisted. Anther-tips bearded. Lodicules 3, oblong, very minute.—A small state collected in Balti by Schlagintweit and in the Karakoram, alt. 9000 ft. by Clarke, is only 18 in. high, with an open panicle 3-6 in. long, and pale purple spikelets.

14. S. Orthoraphium, Steud. Syn. Gram. 131; stem slender, leaves flat or convolute, panicle very narrow, branches few erect few-fld., spikelets \(\frac{1}{2}\)—t in., gl. III as long as II sparsely hairy tip entire, awn glabrous with 2 or more deflexed spinules towards the base. Orthoraphium Roylei, Nees in Proc. Linn. Soc. i. (1841) 94, in Ann. & Mag. Nat. Hist. (1841) 221.
—Streptachne? Wall. Oat. n. 3795.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7-11,000 ft., Wallich, &c. NAGA HILLS, alt. 10,000 ft., Clarke.

Stems densely tufted, 18-24 in. Leares 6-12 in., \(\frac{1}{10} - \frac{1}{2} \) in. broad, and sheaths quite smooth; ligule short, ciliate. Panicle 6-10 in., rachts erect; branches solitary or binate, lower 1-3 in. bearing few distant, narrow, terete, pedicelled spikelets; gls. subequal, 1- or faintly 3-nerved, obtuse or tips sub-dentate; III very narrow, subrostrate; callus short, obconio, bearded; awn 1 in., rather stout, not twisted, nearly smooth, jointed on the gl. but persistent. Lodicules 3, large, oblong, obtuse.

DOUBTFUL SPECIES.

S. BREVIFLORA, Griseb. in Goett. Nachr. (1868) 82; stems 1-14 ft., leaves short convolute, ligule short obtuse, panicle narrow base sheathed, branches 1-2-nate distant, gls. I and II linear-lanceolate acuminate, III seriately hairy, awn 2 in., hairs towards its base shorter.—Western Tibet, Gnari Khorsum, Schlagintweit. Probably S. orientalis, Trin.

61. ORYZOPSIS, Micha.

Perennial grasses. Leaves flat or convolute. Spikelets loosely panicled, ovoid or lanceolate, dorsally compressed, 1-fld. Glumes 3, I and II equal or subequal, acute or subrostrately acuminate, very thin; I 5-nerved; II sub 3-nerved; III shorter, coriaceous, articulate by a short broad glabrous basal callus, lanceolate or oblong-lanceolate, more or less pubescent, tip minutely 2-toothed, with a very slender often caducous untwisted awn; palea oblong, coriaceous, as long as the gl., glabrous or hairy. Lodicules 2, ovate, thin. Stamens 3, anther-tips minutely bearded. Grain dorsally compressed, oblong, free within the hardened gl. and palea.—Species about 16, N. temp. regions.

The species are very variable, and great as is dissimilarity between the average states of the following, apparent intermediates between them occur.

1. **O. lateralis**, Stapf; very slender, leaves short filiform convolute, panicle very narrow strict, branches short erect few-fld., spikelets \(\frac{1}{6-1} \) in. ovoid subrostrately acuminate, gl. I longer than II, awn of III \(\frac{1}{10-1} \) in. very caducous. Piptatherum laterale, Munro ex Regel in Act. Hort. Petrop. vii. (1880) 645; Aitchis. in Journ. Linn. Soc. xviii. (1881) 21, 106. P. molinioides, Boiss. Fl. Orient. v. 509 (The Afghan. pl.). P. soongaricum, Munro in Herb. Kew. P. strictum, Munro in Cat. Pl. Griff. Falcon., &c. 56 (ined.). Milium laterale, Regel. l. c.

WESTERN HIMALAYA; from Kashmir to Kunawur and WESTERN TIBET, alt.

12-14,000 ft. - DISTRIB. Affghanist.?

Stems densely tufted, forming a stout branching base, very slender, smooth. Leanes 2-4 in., smooth or nearly so, neuminate, strict or flexuous; ligule oblong, hyaline. Paniclo 4-10 in., thin, rachis smooth, branches and pedicels scaberulous. Spikelets ovoid or ovate-lanceolate, green or tipped with red-purple; gls. I and II subrostrately acuminate, faintly 5-nerved, pair next the midrib arching and anastomosing with the median, outer pair similarly arching the last lower down; II more obscurely 3-5-nerved; III about \$\frac{1}{2}\$ shorter than II, lanceolate, finely subsilkily pubescent, tip minutely 2-toothed; awn usually very short, very slender, not twisted. Lodicules 2, ovate, hyaline. Anther-cells minutely bearded. Grain oblong.

Var. effusa, lower branches of panicle larger 1-1 in. long. O. effusa, Hack. ex. Herb. Duthie.—Hazara and Baltistan, alt. 9-10,000 ft., Duthie. Karakoram, alt.

10,000 ft., Clarke.

2. **O. Munroi**, Stapf; tall, stem stout or slender, leaves narrow flat, panicle effuse lower branches long many-fld. towards the ends, spikelets \(^1-\frac{1}{4}\) in. ovoid rostrately acuminate, gls. I and II equal, awn of III \(^1\frac{1}{2}\)-\frac{1}{4}\) in. O. divulsa, Herb. Clarke. O. kashmirensis, Hack. ms. ex Herb. Duthie. Piptatherum soongaricum, Duthie in Atkins. Gaz. N.W. Ind. 626 (name). P. holciforme, Herb. Ind. Or. IIf. & T.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 7-11,000 ft. WESTERN

TIBET : Ladak, Nubra and Zanskar, alt. 10-13,000 ft. - DISTRIB. Affghan.

Stem 2-4 ft., about as thick as a crow-quill. Leares 4-10 by 10-1 in., finely acuminate, hardly scaberulous, margins nearly smooth; ligule oblong, hyaline. Panicle 6-12 in., branches in distant pairs, filiform, nearly smooth; lower naked for 1-3 in., then branching shortly and bearing shortly pedicelled spikelts. Spikelets variable, from ovate to lanceolate; gls. I and II green or tipped with purple or whoily purple; III and its palea pubescent. Lodicules, stamens and grain as in lateralis, but larger.—The larger broader glumes longer awn and great size of the plant distinguish this from var. effusa of lateralis.

3. O. æquiglumis, Duthie Grass. N.W. Ind. 27; tall, rather stout, leaves long flat, panicle long effuse or contracted, lower branches long many-fld. towards the ends, spikelets $\frac{1}{4} - \frac{1}{3}$ in. ovoid acuminate, gl. I and II equal, awn $\frac{1}{7} - \frac{1}{3}$ in. ?O. cœrulescens, Duthie Grass. N.W. Ind. 28 (name). O. Duthiei, Hack. ex Herb. Duthie. Piptatherum æquiglume, Munro ex Duthie in Atkins. Gaz. N.W. Ind. 626 (name).—Pipt. n.sp. Herb. Strach. & Wint. n. 2.

TEMPERATE HIMALAYA: from Kashmir to Sikkim, alt. 6-10,000 ft.

Very closely allied to O. Munroi, but usually a stouter plant, and taller, spikelets larger often of a dark or dull green mixed with purple, gls. I and II not so beaked, leaves longer, awn and anthers longer. It may be a state of that plant from moister or warmer localities. I have seen no specimen of O. cœrulescens, Duthic, which was collected at Gungotri, alt. 9-10,000 ft.

62. MILIUM, Linn.

Annual or perennial grasses. Leaves flat. Spikelets loosely panicled, not jointed on their pedicels, ovate, dorsally compressed, 1-fld., rachilla not produced. Glumes 3, I and II subequal, thin, 3-nerved, persistent; III oblong or obovoid, dorsally compressed, coriaceous, shining, not awned; callus very short, broad, naked; palea 2-nerved. Lodicules 2. Stamens 3. Styles short, free. Grain ovoid or oblong, free within the gl. and palea.—Species 5 or 6, N. temp. regions.

M. effusum, Linn. Sp. Pl. 61; perennial, panicle effuse, spikelets glabrous. Fl. Dan. t. 1143; Host Gram. Austr. iii. t. 22; Engl. Bot. t. 1106; Knapp Gram. Britt. t. 19; Kunth Enum. Pl. i. 66, Suppl. 44, t. 10, f. 1; Reichb. Ic. Fl. Germ. t. 45, vii. t. 73; T. Nees Gen. Fl. Germ. Monoc. i. n. 17; Steud. Syn. Gram. 34; Ledeb. Fl. Ross. iv. 510; Aitch. Cat. Panjab Pl. 158; Duthie Grass. N.W. Ind. 28. M. ascendens, Roxb. Hort. Beng. 8 (name). M. dubium, Jacquem. mss. Agrostis effusa, Lamk. Encycl. i. 159.

WESTERN HIMALAYA, alt. 7-11,000 ft., from Kushmir, Jacquemont, &c., to

Kumson, Strackey & Winterb .- DISTRIB. N. Temp. and Arctic regions.

Perennial. Stem 2-4 ft., erect, smooth, shining, leafy. Leaves 6-12 by \$\frac{1}{6}\$ \to \frac{1}{2}\$ in. acute, minutely, scaberulous or smooth above; ligule oblong, truncate, torn. Panicle 5-10 in., close or effuse; branches capillary, fascicled or subverticillate, naked below, at length spreading or deflexed. Spikelets \$\frac{1}{6}\$ in., green.

DOUBTFUL INDIAN SPECIES.

M. PHLEOIDES, Sweet, Hort. Brit. Ed. 2, 555.

63. HELEOCHLOA, Host.

Rigid annual or perennial erect or prostrate grasses. Leaves flat or convolute. Spikelets 1-fld., densely imbricate in cylindric spikes or spiciform panicles, laterally compressed; rachilla not produced above gl. III. Glumes 3, hyaline, I and II subequal or I shorter, keeled, 1-nerved, persistent; III = II or longer, lanceolate or oblong, 1-nerved; palea oblong, obtuse or 2-fld, 2-nerved. Lodicules 2 (or 0?). Stamens 2 or 3. Styles elongate. Grain ovoid, loose in the gl. and palea.—Species few, Oriental.

Crypsis aculeata, Ait., a grass resembling Hel. schoenoides in habit, but with capitate spikelets, is recorded as Indian by Aitchison (Cat. Panjab. Pl. 157), Boissier (Fl. Orient. v. 475) and other works, but no doubt by mistake for Heleochloa schoenoides. I have seen no specimen of Crypsis, which is an Eastern and Siberian plant from India, or even from Afighanistan.

1. H. schoenoides, Host Gram. Austr. i. 23, t. 30; annual, stems compressed prostrate spreading in a circle from the root, panicle ovoidoblong sessile on the greatly dilated sheath of the uppermost leaf. Boiss. I'l. Orient. v. 476; Duthie Fodd. Grass. N. Ind. 48. Crypsis aculeata, Duthie Grass. N.W. Ind. 25, Fodd. Grass. N. Ind. 45, t. 62. U. schoenoides, Lamk. Illust. i. 166, t. 42, f. 1; Kunth Enum. Pl. i. 22, Suppl. 17, t. 5, f. 1; Ledeb. Fl. Ross. iv. 459; Steud. Syn. Gram. 162; Duthie Grass. N.W. Ind. 25. C. compacta, Steud. l.c. 151. C. nilaica, Frescn. & Notar. in Mem. Acad. Tor. Ser. II. xiv. (1854) 322. C. vaginiflora, Opiz Natural. viii. (1824) 83; Steud. l.c. 152. Phalaris vaginiflora, Forsk. Fl. Ægypt. Arab.

18. Phleum schoenoides, Linn. Sp. Pl. 60; Jacq. Fl. Austr. v. App. 29 t. 7 Ic. i. 2 t. 15; Cav. Ic. i. t. 52, f. 5. Spartina phleoides, Roth. Neue Beytrag. i. 101. Pechez sub-cylindrica, Pourr. Chlor. Narbon. n. 103.

The Panjab, Western Himalaya, and Western Tibet; Kashmir, Jacquemont. Iskardo, alt. 7000 ft., Thomson. Bandulkund, Duthie. ? Sikkim; at Dorijling.

Herb. Griffith .- DISTRIB. Westward to the Atlantic.

Glaucous. Stems many, 1-10 in., prostrate with ascending tips, leafy, rigid. Leaves 1-2 in., narrowly lanceolate, acuminate; sheaths deeply furrowed, margins glabrous or ciliate; ligule a short ring of hairs. Panicle \(\frac{1}{2}-2\) in. by \(\frac{1}{2}-1\) in. diam., green. Spikelets \(\frac{1}{2}\) in.; gl. all 1-nerved, keels ciliate; I and II narrowly lanceolate, acuminate; I shortest; III ovate-lanceolate, acuminate; pulea oblong, truncate, nerveless. Lodicules 2, oblique, cuneate. Stamens 2-3, filament very long; anthers small.—The Bandulkund specimens are very small and pale, almost silvery white, with very small spikes hardly emerging from the leaf-sheath. The Sikkim habitat is probably due to a misplaced ticket.

2. M. dura, Boiss. Fl. Orient. v. 477; perennial, minutely pubescent, stem stout ascending, leaves involute pungent, panicle elongate cylindric narrow. H. alopecuroides, Duthie Fodd. Grass. N. Ind. 48 (non Boiss.). Crypsis dura, Boiss. Diagn. Ser. II. iv. 125. C. phalaroides, Duthie Grass. N.W. Ind. 25 (non M. Bieb.). Vilfa setulosa, Trin. in Mem. Acad. Petersb. Ser. VI. v. ii. (1840) 55; Steud. Syn. Gram. 154.

SCIND. Stocks, in salt water .- DISTRIB. Arabia.

Whole plant pale, and clothed with a very fine velvety pubescence. Stems 6-10 in., densely fastigiate from a woody inclined base which is clothed with leaf-sheaths, ascending, stout, as thick as a crow-quill, hard, few-leaved. Leaves 3-6 in., quite terete, rigid, pungent; sheaths short, coriaceous; ligule O. Spikes 2-4 in. by 2-1 in. diam. Spikelets 1 in., membranous, gl. all 1-nerved and with ciliate keels, 1 and 11 narrowly oblanceolate, acuminate; 111 half as long again, oblong, mucronate; palea oblong, bifid, 2-nerved, lobes obtuse ciliate. Lodicules 2, obliquely cuneate, acute. Stamens 2; filaments very long; anthers short. Ovary ovoid; styles very long, slender.—Boissier cites Griffith by error, for Stocks, under the habitat of Scind.

64. PHLEUM, Linn.

Annual or perennial grasses. Leaves flat. Spikelets 1-fld., with rarely a rudimentary 2, imbricated on cylindric or oblong spiciform panicles, strongly laterally compressed, not jointed on the very short pedicels; rachilla sometimes produced beyond gl. III. Glumes 3, I and II equal, keeled, awned or mucronate; III much smaller, hyaline, awned or not, 3-5-nerved, toothed; palea small. Lodicules 2. Stamens 3. Ovary glabrous; styles long. Grain compressed, free within the gl. and palea.—Species about 10, temp. and Arctic.

Phleum pratense, Linn. (Timothy grass) is mentioned by Royle (Ill. Bot. Himal. 417, and Duthie Grass. N.W. Ind. 28) as a native of the N.W. Himalaya (Urukta & Chur), but this has never been confirmed.

1. P. alpinum, Linn. Sp. Pl. 59; perennial, upper sheaths inflated, panicle ovoid or oblong, gl. 1 and II truncate as long as their awns keels hispid, III 3-nerved. Fl. Dan. t. 213; Host Gram. Austr. iii. t. 10; Kunth Enum. Pl. i. 29; Trin. Sp. Gram. Ic. t. 21; Engl. Bot. t. 519; Knapp Gram. Brit. t. 7; Reichb. Ic. Fl. Germ. t. 50; Ledeb. Fl. Ross. iv. 458; Steud. Syn. Gram. 150; Boiss. Fl. Orient. v. 484; Wall. Cat. n. 3779; Dutkie Grass. N.W. Ind. 28. P. Hænkeanum, Presl Rel. Hænk. i. 245;

Steud. l.c. 150. P. nigricans, Willd. ew Trin. in Mem. Acad. Petersb. Ser. VI. v. II (1840) 123. P. ovatum, Jacquem. mes.

Temperate and Subalpine HIMALAYA, alt. 10-13,000 ft., from Kashmir eastwards,

in wet places. - DISTRIB. Arctic and Alpine regions. Fuegia.

Stem solitary, 6-18 in., ascending from a creeping base, smooth, stiff. Leaves short, spreading; ligule short. Paniels \(\frac{1}{2}-1\)\frac{1}{2}\) in., green or purplish; gl. I and II \(\frac{1}{2}\) in. with the awn.

2. P. arenarium, Linn. Sp. Pl. 60; annual, upper sheaths inflated, panicle cylindric or oblong narrowed at the base, gl. I and II lanceolate finely acuminate hardly awned keels ciliated above, III very small hairy. Fl. Dan. t. 915; Kunth Enum. Pl. i. 28; Reichb. Ic. Fl. Germ. t. 50; Ledeb. Fl. Ross. iv. 456; Steud. Syn. Gram. 151; Boiss. Fl. Orient. v. 481; Aitchis. Cat. Panjab Pl. 158; Duthie Grass. N.W. Ind. 28. P. ramosum, Gilib. Exercit. ii. 519. Phalaris arenaria, Willd. Sp. Pl. i. 328; Engl. Bot. t. 222; Knapp Gram. Britt. t. 4. Crypsis arenaria, Desf. Fl. Atlant. i. 63. Chilochloa arenaria, Beauv. Agrost. 37. Achnodon arenarius, Link Enum. Hort. Berol. i. 65. Achnodonton arenarium. Trin. Diss. i. 166.

The PANJAB and WESTERN HIMALAYA; in Kashmir and Kishtwar, ascending to

9000 ft., Jacquemont, &c.-DISTRIB. Westward to the Atlantic.

Stems 6-14 in., tufted, glabrous, leafy. Leaves flat, sheaths smooth; ligule elongate, oblong. Panicle 1-2½ by ½-¾ in., glaucous, sometimes lobed. Spikelete ½-¾ in., rachilla produced beyond gl. III; gls. I and II punctulate; III 3-nerved.—Var. Thomsonii, Griseb. in Goett. Nachr. (1868) 83. I find no character whereby to distinguish this from the common form.

3. P. asperum, Jacq. Collectan. i. 110, Ic. Rar. t. 14; annual, panicle long slender cylindric, gl. I and II cuneately obovate truncate cuspidate, keels scabrid above, III oblong obtuse pubescent. Vill. Fl. Delph. ii. 61, t. 2, f. 4; Kunth Enum. Pl. i. 28; Steud. Syn. Gram. 151; Boiss. Fl. Orient. v. 481; Aitchis. Cat. Panjab Pl. 158; Duthie Grass. N.W. Ind. 28. P. viride, All. Fl. Pedem. ii. 232. P. paniculatum, Huds. Fl. Angl. 23 (excl. Syn.); Engl. Bot. t. 1077; Knapp Gram. Britt. t. 8. P. ventricosum, Moench Meth. 177. P. viride, All. l.c. Phalaris aspera, Retz. Obs. iv. 14; Host Gram. Austr. ii. t. 37. Phal. paniculata, Ait. Hort. Kew, i. 87. Chilochloa aspera, Beauv. Agrost. 37; Reichb. Ic. Fl. Germ. t. 51.

The PANJAB HIMALAYA, Royle, &c. KUNAWUE (Herb. Munro). KASHMIE, alt. 5-6000 ft., Jacquemont, &c. The SALT RANGE, Aitchison.—DISTRIB. Westward to the Atlantic.

Stem 6-18 in, tufted, stout, rigid. Leaves broad, margins scabrid. Panicle 1-4½ by ½-½ in. diam. Spikelets green, ½-½ in.; gl. I and II rigid, glabrous or scabrid, the sinus between them rounded, 3-nerved, dilated above with gibbous membranous margins, III membranous = ¾ of I and II.—Scent of Anthosanthum.

65. ALOPECURUS, Linn.

Annual or perennial grasses. Leaves flat. Spikelets 1-fld., strongly laterally compressed, imbricating in a cylindric or oblong spiciform panicle, jointed on the tumid tip of the very short pedicels, rachilla not produced beyond gl. III. Glumes 3, I and II subequal, strongly compressed, keeled, often connate by their margins below; III as long as I and II, hysline, convolute, with usually a basal or median dorsal awn; palea 0 (in Indian sp.). Lodicules 0. Stamens 2 or 3. Ovary glabrous. Grain laterally compressed free.—Species about 20, temp. and cold regions.

- * Perennials. Panicle ovoid or oblong.
- 1. **A. himalaicus**, Hook. f; upper leaf-sheaths inflated, panicle oblong or subcapitate, spikelets $\frac{1}{5}$ — $\frac{1}{4}$ in., gls. I and II lanceolate subaristately acuminate hirsute with spreading hairs longer than the spikelet is broad, III much shorter than I and II, awn twice as long as the spikelet or more.

KASHMIR and DRAS, alt. 10-14,500 ft., Falconer, &c.

Stem 6-18 in., subsolitary, erect from a creeping base, rather stout. Leaves 3-5 in., erect or spreading, upper shorter lanceolate acuminate; upper sheaths 3-5 in., ower appressed; ligule large, scarious, toothed. Panicle 1-1½ in., grey-green or purplish. Spikelets membranous, hairs flaccid; gls. I and II connate below, tips dark; III ½ shorter than I or II, obtuse, apculate.—Most nearly allied to A. phalaroides, Schur, of Hungary, which is hardly distinguishable from A. brachystachyus, Bieb., of Siberia; but the spikelets of A. himalaicus are much larger than in those species, from which its acuminate gls. I and II and short III at once distinguish it.

2. A. arundinaceus, Poir. Encycl. viii. 766; rootstock creeping, panicle cylindric, spikelets \(\frac{1}{2} \) in., gl. I and II connate below acute keel ciliate with long hairs, awn short. Boiss. Fl. Orient. v. 487; Steud. Syn. Gram. 150. A. altissimus, Schur in Estr. Bot. Zeitschr. ix. (1859) 13. A. elatior, Jacquem. mss. A. muticus, Kar. & Kir. in Bull. Soc. Nat. Mosc. xv. (1842) 527; Steud. l.c. 148. A. nigrescens. Jacq. Eclog. Gram. it. t. 13. A. nigricans, Hornem. Hort. Hafn. i. 68; Kunth Enum. Pl. i. 24. A. pratensis, Aitchis. Cat. Panjab Pl. 158; Duthie Grass. N.W. Ind. 26, Fodd. Grass. N. Ind. 46 (non Linn.), A. pratensis, var. ruthenicus, Trin. Sp. Gram. Ic. t. 45. A. repens, Bieb. Fl. Taur. Cauc. iii. 54. A. ruthenicus, Weinm. in Fl. Dan. t. 2881. A. sibiricus, Hort. Vind. ex Roem. & Sch. Syst. ii. 271. A. ventricosus, Pers. Syn. i. 80.

WESTERN HIMALAYA, alt. 8-12,000 ft., from Kashmir to Garwhal.-DISTRIB.

Westward to Europe, N. Asia.

Stem 2-4 ft., erect, slender. Leaves 6-10 in., acuminate; upper sheaths slightly inflated, 4-6 in. long; ligule rounded. Panicle 1-3 in. by \(\frac{1}{2}\)-\(\frac{1}{3}\) in. diam., green, soft. Spikelets subsilky; gl. I and II lanceolate, acuminate, more or less connate at the base or to above it; III acute, tip scaberulous; awn subbasal.—I doubt this being more than a form of \(\frac{A}{2}\). pratensis, L.

- ** Annuals or subperennials. Panicle cylindric.
- 3. A. aristulatus, Michx. Fl. Bor. Am. i. 43; stems slender geniculately ascending, leaves glaucous, panicle slender, spikelets $\frac{1}{12} \frac{1}{10}$ in oblong, gls. I and II hyaline obtuse softly ciliate, III truncate, awn median-dorsal short, anthers oblong bright yellow. A. fulvus, Sm. Engl. Bot. t. 1467; Fl. Dan. t. 1804; Kunth Enum. Pl. i. 24; Reichb. Ic. Fl. Germ. t. 49; Ledeb. Fl. Ross. iv. 464; Boiss. Fl. Orient. v. 487; Steud. Syn. Gram. 407. A. geniculatus, Poll. Hist. Pl. Pal. n. 66; Host Gram. Austr. ii. t. 32 (non Linn.). A. paludosus, Beauv. ex Mert. & Koch. Fl. Germ. i. 481. A. subaristatus, Pursh. Fl. Am. Sept. i. 66.

WESTERN HIMALAYA; Kashinir, in marshes, alt. 6-14,000 ft., Clarke, Duthie.-

DISTRIB. Europe, N. Asia, N. America.

Stem 6-18 in., creeping below, flaccid. Leaves 4-8 in., linear, flat; upper sheaths somewhat inflated; ligule elongate. Panicle 1-2 in. by $\frac{1}{6}$, $\frac{1}{4}$ in. diam., green. Gls. I and II free or connate at the very base, elliptic, obtuse.—Regarded by various authors as a variety of A. geniculatus, L.

4. A. geniculatus, Linn. Sp. Pl. 60; stems erect or geniculate. below, leaves not glaucous, spikelets $\frac{1}{10}$ - $\frac{1}{6}$ in. oblong, gls. I and II connate at or above the base subacute or obtuse hyaline ciliate, III truncate, awn subbasal, anthers linear orange-yellow. Engl. Bot. t. 1250; Knapp Gram. Brit. t. 18; Kunth Enum. Pl. i. 24, Suppl. 18, t. 7, f. 1; Trin. Sp. Gram. Ic. t. 42; Steud. Syn. Gram. 147; Aitchis. Cat. Panjab Pl. 157; Duthie Grass. N.W. Ind. 25, Fodd. Grass. N. Ind. 46; Benth. Fl. Hongk. 408, Fl. Austral. vii. 555. A. australis, Nees in Hook. Journ. Bot. ii. (1843) 412; Steud. l. c. 148. PA. diandrus, Griff. Notul. iii. 11, Ic. Pl. Asiat. t. 142, f. 2. A. paniceus, O. Muell, in Fl. Dan. t. 861. A. ramosus, Poir. Encycl. viii. 776; Steud. l. c. 146.—Alopecurus, Wall. Cat. n. 3780 C.

Temperate and Subtropical HIMALAYA, alt. 3-7000 ft., from Kashmir to Bhotan.

? Assam, Griffith .- DISTRIB. Most temp. regions.

Stems 6-18 in., stout or slender. Leaves \(\frac{1}{2}\)-\(\frac{1}{2}\) in. broad; upper sheaths more or less inflated; ligule oblong. Panicle 1-3 in. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in. diam., greenish-yellow. Spikelets larger than in \(A\). aristulatus, not so membranous; gl. III with the truncate tip sub-erose. Stamens 2 or 3.—Of Griffith's \(A\). diamlrus, there are under the same number (Kew distrib. 2693) slender narrow-leaved specimens from Rydang in Bhotan, quite like the western Indian plant, but also a much larger one from the sandy banks of the Burrampooter in Assam, with many stout stems from the root, much broader leaves, with more ventricose upper sheaths, and rather stouter panicles (it is n. 6463 Kew distrib.). Griffith, in his Itinerary Notes (158, n. 801, and Notulæ 1.c.), says the stems and young sheaths are glaucous, and he figures the anthers as oblong and yellow, which are characters of aristulatus; but the habit and spikes are those of geniculatus. It may prove to be a distinct species.

5. A. agrestis, Linn. Sp. Pl. Ed. II. 89; stem erect or geniculate below, spikelets in gl. I. and II. connate to or below the middle obtuse, keels narrowly winged, III narrowly oblong tip truncate, awn subbasal twice as long as the spikelet recurved. Fl. Dan. t. 697; Host Gram. Austr. iii. t. 12; Engl. Bot. t. 848; Knapp Gram. Brit. t. 16; Kunth Enum. Pl. i. 23; Trin. Sp. Gram. Ic. t. 37; Reichb. Ic. Fl. Germ. t. 19; Ledeb. Fl. Ross. iv. 465; Steud. Syn. Gram. 149; Boiss. Fl. Orient. v. 485; Duthie Grass. N.W. Ind. 25, Fodd. Grass. N. Ind. 46; Benth. Fl. Hongk. 407, Fl. Austral. vii. 555. A. myosuroides, Huds. Fl. Angl. 23.

Temperate and Subtropical HIMALAYA; Kashmir, &c. The PANJAB. KHASIA HILLS, alt. 3000 ft., Clarke. MUNNEPORE, alt. 3000 ft., Watt.—Distrib. Europe. W. and N. Asia. Introd. elsewhere.

Stem 6-10 in., or more. Leaves scaberulous, upper sheaths slightly inflated; ligule oblong. Panicle 1-3 in. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in. diam., pale green. Spikelets loosely inbricate, rather narrow, glabrous except the keels of gl. I and II; gl. III narrowly oblong, truncate, tip toothed; awn rather stout. Anthers long, narrow.—Possibly not indigenous in Iudia. Watt describes it as found in rice-fields in Munnepore.

6. A. nepalensis, Trin. ex Steud. Syn. Gram. 148; stem. erect or geniculately ascending, spikelets $\frac{1}{10} - \frac{1}{8}$ in. obovate, gl. I and II connate to the middle subacute keels narrowly winged scabrid, III narrowly oblong, tip truncate exserted, awn subbasal very short or 0.—A. navicularis, Ham. ex Wall. Cat. n. 3780 A.—Alopecurus, Wall. Cat. l. c. A. B.

UPPER GANGETIC PLAIN; Oude, Hamilton. The PANJAB; Lahore, Thomson;

Garwhal, Jacquemont.

Perhaps only a form of A. agrestis, which it closely resembles, but the spikelets are much smaller and very closely imbricate, less contracted at the base, and the keel of the glume is not ciliate. Stamens 3, anthers long.

66. PHIPPSIA, Br.

Very small perennial grasses. Leaves narrow. Spikelets minute, laterally compressed, in sparingly branched subspiciform panicles, not jointed on their pedicels; rachilla not produced beyond gl. III. Glumes 3, membranous, all persistent, 1 and II very short, obtuse, nerveless; III terminating the stipitiform rachilla, oblong, obtuse or tip rounded, nerves 0 or 1-3; palea as long or longer than the gl., tip 2-fid, nerves very faint. Lodicules 2, hyaline. Stamens 1-3. Styles very short, free, plumose to the base. Grain oblong, loose.—Species 2, an Arctic and the following.

This genus should perhaps be placed near to Colpodium.

P. himalaica, Hook. f.; palea much longer than its gl.

ALPINE WESTERN HIMALAYA; Kumaon, Barji-Khang Pass, alt. 14,500 ft., Strackey & Winterbottom; Garwhal, on the Duder Glacier, alt. 13-14,000 ft., Duthie.

Densely tufted, 6-8 in. high, very slender. Leaves 2-4 by \(\)_6 in., linear, obtuse; ligule long. Fanicle 1-1\(\frac{1}{2}\) in., sometimes almost reduced to a spike; rachis slender, smooth; branches very few, short, erect and appressed to the rachis, bearing 2-3 spikelets. Spikelets \(\frac{1}{6}\) in. long, pale brown; gl. I shortest, ovate, obtuse; II almost orbicular, concave, = about \(\frac{1}{4}\) III, nerveless, tip rounded; III raised on a short cylindric naked rachilla, concave, obtuse, nerveless, sparsely hairy on the back towards the base; palea longer than the gl. and nearly as broad, concave, tip 2-fid, keels ciliate. Lodicules 2, ovate-lanceolate. Stumen 1, filament very long; anther nearly as large as gl. III. Ovary narrow; stigmas broadly plumose.—Differs from the Arctio P. algida, in the much narrower leaves, in the fewer very shortly pedicelled larger spikelets not crowded on lateral branches, in the narrower gl. III, long palea, very large auther, broadly plumose stigmas, and long ligule.

67. CYATHOPUS, Stapf.

A slender perennial grass. Leaves flat. Spikelets 1-fld., very small, subterete, singly pedicelled on the branches of a decompound narrow panicle, articulate on the cupular tip of the pedicel, rachilla not produced beyond the flg. gl. Glumes 3, I and II subequal, oblong, beaked, persistent, stroi gly 3-nerved; III rather shorter, membranous, obtuse, 5-nerved below the middle; palea lanceolate, acute, keels smooth. Lodicules 2, ovatelanceolate. Stamens 3, anthers short. Styles distinct, stigmas short.

C. sikkimensis, Stapf in Hook. Ic. Pl. t. 2395. Hymenachne, n. 3. Herb. Ind. Or. Hf. & T. Milium Treutleri, Kuntze Rev. Gen. Pl. 780 (in part).

SIKKIM HIMALAYA; Lachoong Valley, alt. 7-10,000 ft., J. D. H.

Stem 2-3 ft. high, from a creeping stoloniferous base. Leaves 6-10 by \(\frac{1}{4} \) in, finely acuminate, many-nerved, scaberulous, margins thickened smooth; sheaths deeply striate; ligule elongate, scarious. Panicle 8-12 in., oblong, or pyramidal; rachis and branches flexuous, terete, scaberulous; branches fascieled or subverticillate, lower 2-4 in. long, naked below. Spikelets \(\frac{1}{4} \) \(\frac{1}{10} \) in., scaberulous, shortly pedicelled, pale green; gls. I and II stoutly subaristately beaked, scaberulous; nerves scabrid; III oblong, nerves slender; callus obconical; palea linear-oblong, 2-nerved. Anthers and stigmas short.—Munro regarded this very distinct grass as forming a new genus near the Hymenachne section of Panicum. Dr. Stapf has, I think, rightly referred it to near Garnotia.

671. WOODROWIA, Stapf.

(Genus not in Clavis, p. 7.)

Annual. Leaves narrow, flat. Spikelets 2-5, 1-fld., subdigitately panicled at the top of a slender peduncle, articulate on a fragile rachis, laterally compressed, rachilla not produced beyond the flg. gl. Glumes 3, I and II strongly laterally compressed, empty, acute, dorsally rounded and there sometimes much thickneed, 1-nerved, 1\frac{1}{3} longer than II; III = II, hyaline, 1-nerved, 2-lobed with a slender interposed geniculate awn; palea obovate-oblong, hyaline. Lodicules 2, cuneate, lobulate. Stamens 2, anthers linear. Styles free and stigmas very slender. Grain slender, cylindric, free within the gls.

W. diandra, Stapf in Hook. Ic. Pl. t. 2447.

The DECCAN; Poonah District, Woodrow.

Stem 12-18 in., slender, branched, nodes hairy. Leaves 3-4 by \(\frac{1}{18} \) \(\frac{1}{6} \) in., acuminate, hirsute, margins scabrid; sheaths appressed, glabrous or hairy at the mouth; ligule short, ciliolate. Spikes 1-2 in., rachis slender, hairy. Spikelets rather distant, \(\frac{1}{2} \) in. long, green or blueish; gl. I dorsally hairy, margins ciliolate; keel of III densely ciliate; awn of III 1 in., column shorter than the upper part, spirally ciliate.—This interesting plant arrived at Kew after the printing of the key, p. 7.

68. GARNOTIA, Brongn.

Erect, perennial rarely annual grasses. Leaves flat or convolute. Spikelets very small, 1-fld., panicled, solitary or geminate, jointed on the pedicels, narrowly-lanceolate; rachilla not produced beyond the fl. gl. Glumes 3, I and II empty, subequal, 3-nerved, acuminate, equalling or longer than III, awned or not; III bisexual, 1-3-nerved, triandrous, very narrow, terete, tip acuminate or notched, awned, rarely awnless or 3-awned; awn straight or base twisted, rarely geniculate or recurved; sides of palea auricled at the base. Lodicules 2. Styles free. Grain linear or oblong, free.—Species about 20, Asiatic and Polynesian.

In the disposition and description of the species I have been aided by Dr. Stapf, who has drawn up an account of the whole genus.

- A. Stems densely tufted, uppermost internode exceeding the rest of the stem. Leaves long, stiff, erect, not articulate on the sheath; basal sheaths equitant, flattened.
- * Leaves narrow, complicate (triangular on section); margins of lower sheaths woolly, at length glabrate.
 - † Awn of gl. III reflexed from the twisted base.
- 1. G. Thwaitesii, Stapf. mss.; stem very tall stout, panicle 1-2 ft. much branched, branches long slender, spikelets $\frac{1}{h} \frac{1}{h}$ in. base shortly hairy, gl. I and II acuminate or shortly awned. G. scoparia, Thwaites Enum. Pl. Zeyl. 363; Trim. Cat. Ceyl. Pl. 106. Berghausia scoparia, Munro ex Thw. l. c.

CEYLON; hotter parts of the island, Thwaites.

Stem 2-4 ft. and more, often as thick as a goose-quill below, compressed. Leaves 1-3 ft., about \(\frac{1}{2} \) in. broad, wiry; lower sheaths strongly compressed and keeled, margins above woolly; ligule very short, ciliate. Panicle very variable in length

and breadth, copiously effuse. Gl. I and II entire or notched with a short awn in the notch; III tip notched or entire, awn rarely twice as long as its gl.—Steudel refers Koenig's Agrostis scoparia to Arundinella nervosa, Nees. A specimen so named in Rottler's Herbarium is a grass 10 ft. high with flat leaves $\frac{3}{5}$ in. broad and panicle $\frac{3}{5}$ ft. long, the spikelets have all fallen away. It is probably Thysanolana.

- ++ Awn not reflexed from the twisted base, bent above, 0 in G. tectorum.
- 2. **G. Schmidii**, *Hook. f.*; stem 1-3 ft. simple or branched above, leaves very narrow flexuous, paniele 6-10 in. narrow, spikelets $\frac{1}{6}$ in. pale or dark brown, base bearded, glumes I and 11 notched and awned, III nearly as long as I notched, awn twice as long as the glume.

NILGHIRI HILLS, Schmid; Gondaloor Ghat, alt. 4500 ft., Lawson.

Stems tufted, base with the distichous leaf-sheaths an inch broad. Leaves 15 in. broad, shorter than the peduncle. Panicle erect, branches 1-11 in., erect.—Schmid's specimens are small, 1 ft. high with a rather loose panicle and almost red-brown spikelets. Lawson's is a very much larger plant with longer leaves and denser panicle and paler spikelets.

3. **G. tenuiglumis**, Stapf. mss.; stem tall stout, leaves very narrow, panicle 2 ft. very narrow, spikelets $\frac{1}{9}$ in., base nearly glabrous, glumes thin, II 1-nerved, awn of III short capillary base twice or thrice twisted. Chrysopogon muricatus, Herb. Wight, n. 3247.

WESTERN PENINSULA, Wight.

Stem 3-4 ft., as stout as a goose-quill, solid, upper internode 10-16 in. Leanes 12-16 in., exceeding the stem, glabrous except towards the very base; sheaths subcompressed, margins above woolly; ligule a ridge of hairs. Panicle strict, rachis stout, terete; branches 2-3 in., filiform, in distant clusters, strict, erect. Spikelets pale yellow-brown, appressed to the branchlets; gl. I aristulate; II subhyaline; awn of III rather longer than the spikelets.

4. G. scoparia, Stapf. mss.; stem 3 ft., leaves very narrow plicate or keeled, panicle 16-20 in. long narrow branches very long, spikelets \(\frac{1}{2} \) in. base shortly bearded, glumes firm, II 3-nerved, awn of III about as long as the spikelet, base twisted. Berghausia scoparia, Munro in Herb. Ind. Or. II.f. \(\frac{3}{2} \) T. B. elata, Arn. ex Miq. Analect. Bot. ii. 20. Miquelia elata, Arn. ex Nees in Wight Cat. n. 2600, ex Miq. I.c. Agrostis scoparia, Koen. et Aristida arundinacea, ex Wall. Cat. n. 8912 A. A. laxa et Aristida montana, Herb. Rottl. ex Wall. 8912 B.—Gramin. Wall. Cat. n. 8912.

Mysore; at Chitaldrug, Heyne; Mysore & Kurg, G. Thomson.

Stem nearly as thick as a goose-quill below. Leaves erect, very narrow, glabrous or margius towards the base hairy; sheath with woolly margins; ligule a ridge of hairs. Panicle very narrow, branches 6-8 in., filiform, erect. Spikelets pale yellow; gl. I and II subsimilar, I subaristately acuminate, III 2-dentate, awn geniculate.

5. G. tectorum, Hook. f.; stem very tall stout, leaves long \(\frac{1}{2}\): broad, panicle 1-2 ft. narrowly oblong branches lax-fld. at length spreading, spikelets \(\frac{1}{2}\) in. base obscurely pubescent, gl. all subequal acuminate or mucronate not awned. G. stricta, Thw. Enum. Pl. Zeyl. 363 (excl. Syn.); Trim. Cat. Ceyl. Pl. 106. Berghausia mutica, Munro in Proc. Amer. Acad. iv. (1864) 362.

CEYLON; in elevated parts of the Island, Gardner, &c.

Stem 3-4 ft., as thick as a goose-quill below, strict. Leaves 2 ft., linear, acute, base plicate, more or less hairy; sheath hirsute above or glabrous; ligule very short,

truncate, ciliate. Panicle 8-18 in.; rachis stout, strict; branches slender, rigid. Spikelets rather few and distant, geminate, lower subsessile, upper on capillary pedicels.

- B. Leaves scattered, linear or very narrowly lanceolate. flaccid, articulate on the sheath.
- 6. G. polypogonoides, Munro ex Oliver in Hook. Ic. Pl. t. 1481; stem 6-12 in. slender, leaves 10-1 in. broad lanceolate from a narrow base, panicle contracted flexuous, spikelets 1 in. base bearded, gl. I and II entire one or both long-awned, III 3-awned. G. polygonoides, Duthie Grass. N.W. Ind. 12. Berghausia Emodi, Endl. ex Miq. Analect. Bot. II. 20. Miquelia Emodi, Arn. & Nees in Nov. Act. Nat. Cur. xix. Suppl. I. (1843) 179; Steud. Syn. Gram. 119.—Gen. Nov. Wall. Cat. n. 8884.

TEMPERATE HIMALAYA; from Garwhal to Sikkim, alt. 6-9000 ft.

Stem tufted, rarely branched, about as thick as a crow-quill. Leaves 4-6 by 1-1 in., hirsute towards the base; sheath with glabrous or pubescent margins; ligule very short, fimbriate. Panicle 2-5 in.; branches subscaberulous. Spikelets green or brown; gl. I narrowly lanceolate, 3-nerved; II broader; III dark brown, 2 lateral nerves excurrent as minute bristles, median awn many times longer than its gl., base twisted.

7. G. stricta, Brongn. in Duperr. Voy. Bot. 132, t. 21; stems 2-3 ft. tufted, leaves $\frac{1}{10} - \frac{1}{3}$ in. broad, lower lanceolate from a narrow base, panicle 2-10 in. very narrow, branches in distant fascicles, spikelets $\frac{1}{10} - \frac{1}{3}$ in. base sparsely hairy, gl. I and II finely acuminate or II notched below the awn, III entire or notched awned or not, awn shorter or longer than its gl. G. ascendens & Griffithii, Munro in Cat. Pl. Griff. Helf. &c. ined. G. augustata, Hack. mss. G. sandvicensis, Hillebr. Fl. Hawaii, 513. ? Berghausia pallens & B. tenella, Arn. ex Miquel Analect. II. Bot. 21, 22. B. ascendens, Munro mss. Andropogon adscendens, Heyne ex Wall. Cat. n. 8906. — Chrysopogon?, Wall. Uat. n. 8789. — Tripogon?, Wall. l. c. n. 8991. — Gramin. Wall. l. c. n. 8906. — Aira, Griff. Notul. iii. 56, Ic. Pl. Asiat. t. 145.—Herb. Wight, n. 3243, 3244.

SUBTROPICAL and TEMPERATE HIMALAYA, from Garwhal to Mishmi and BURMA, alt. 4-9000 ft. Khasia Hills, alt. 4-6000 ft. Behab; on Parusnath. Clarke. Chota Nagpore and Western Ghats, from the Concan southward, Wight, &c.

(Kew distrib. 6780, 6781, 6787).—DISTRIB. Sandwich Islds.

Annual? Stem usually geniculate and branched at the base, rarely thicker than a crow-quill, stiff, nodes glabrous or pubescent Leaves 6-10 in., lanceolate or linear-lanceolate, flat or margins involute, glabrous or hirsute or scabrid above; sheath glabrous or hirsute above; ligule short, truncate. Panicle strict or flaccid, branches scaberulous. Spikelets pale; gl. I and II 3-nerved, median nerve sometimes excurrent, III 1-nerved or nerveless, median awn 1 in. or less.—Probably G. patula, Munro, of China and Tonkin, which has densely tufted leaves, is this species.

Var. khasiana, Stapf; stout, 3 ft. high, leaves sometimes nearly 1 in. broad,

panicle a foot long.

Var. brevieristata, Stapf; gl. I and II not awned.

8. G. arundinacea, Hook. f.; stem branched, leaves lanceolate from a rounded or subcordate base flat acuminate, panicle 4-6 in. nodding, branches fastigiate capillary, spikelets $\frac{1}{12} - \frac{1}{6}$ in., gl. I and II notched and awned, awn of III twice as long as its gl. Andropogon arundinaceus Heyne in Herb. Rottler.

NILGHIEI HILLS, alt. 2-6000 ft., Heyne, &c.

Stem reedy, as thick as a pigeon's quill, branches ascending. Leaves 2-3 in. by

in. broad at the base; sheath villous at the top; ligule very short, pubescent. Panicle flexuous, branches and capillary pedicels scaberulous. Spikelets pale, base sparsely hairy; awns variable in length, median very slender, not twisted.

9. G. Forgussonii, Trim. in Journ. Bot. xxvii. (1889) 170; stem 1-3 ft., leaves linear densely bearded at the base, panicle 4-6 in. oblong, branches at length spreading, spikelets often in dimorphic pairs, upper \(\frac{1}{2-\frac{1}{2}}\) in. base obscurely bearded, gl. I and II entire awned or not, III entire or tip 2-fid, awn twisted at the base at length deflexed. G. patula, Thu. mss. (C.P. 3947); Trim. Cat. Ceyl. Pl. 106. Andropogon Beckettii, Thu. mss.

CEYLON; Matale district, Beckett; Knuckle's Mts., alt. 5-6000 ft., Fergusson. Stems smooth, branched. Leaves 4-8 by 1-1 in., and sheath glabrous or sparsely hairy; liquid short, truncate. Passicle pale green or purplish, branches smooth. Spikelets in pairs, the upper often reduced to a glume; gl. I and II oblonglanceolate, awn short or 0; III with a single awn about 1 in. long.

10. G. courtallensis, Thwaites Enum. Pl. Zeyl. 363; stem 8-18 in. slender, leaves linear not densely bearded at the very narrow base, panicle 1-3 in. lax, branches at length spreading, spikelets sometimes in dimorphic pairs in base obscurely hairy, gl. I and II lanceolate awnless or mucronate, III entire or tip notched, awn geniculate twisted below the knee. Trim. Cat. Ceyl. Pl. 106. Miquelia courtallensis, Arn. ex Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 179; Steud. Syn. Gram. 119. Berghausia courtallensis, Nees ex Miq. Analect. Bot. II. 20.—Wight Herb. n. 2376.

NILGHIRI and TRAVANCORE HILLS, Wight, &c., alt. 6000 ft., Lawson.

CEYLON: Adam's Peak, alt. 4000 ft., Gardner, &c.

Stems simple or branched. Leaves rarely 3 in. long, lanceolate, acuminate, spreading, membranous, more or less hairy, as are the sheaths; ligule very short. Panicle pale; branches smooth or slightly scaberulous. Spikelets few, shortly pedicelled; gl. I and II broader than usual in the genus, I thin, 3-nerved.—Batratherum, Wall. Cat. n. 8827, Andropogon minutissimus, Herb. Heyne, referred here by Steudel, is a totally different plant (see p. 147).

11. G. micrantha, Thwaites Enum. Pl. Zeyl. 363; stem 1-3 ft. branched and often creeping below, leaves linear-lanceolate from a narrow base, panicle 2-10 in. contracted lax-fid., branches capillary, spikelets \(\frac{1}{12} - \frac{1}{16} \) in. subsolitary, gl. I and II acuminate, III shortly awned or mucronate. Trim. Cat. Ceyl. Pl. 106.

CEYLON; Central Province, alt. 2-4000 ft., Thwaites (C.P. 945).

Stoms elongate, branched, tufted and ascending, or creeping below. Leaves 4-8 by 1-1 in., sparsely hairy beneath; sheath glabrous except at the tip; ligule very short, truncate. Pasicle pale green, at first contracted; branches scaberulous, at length spreading Spikelets obscurely hairy at the base; awn about 1 in., strict, not twisted.

Var. nana, Stapf; stem short very slender, panicle 1\frac{1}{2} in., gl. III not awned Berghausia mutica, var. nana, Munro mss. Ceylon (C.P. 944).

12. **G. fuscata**, Thwaites Enum. Pl. Zeyl. 363; stems short tufted and creeping, base leafy, leaves short linear, panicle narrow few-fid., spikelets \(\frac{1}{2}\) in. base shortly bearded, gl. I and II with setaceous tips, III with a long awn compressed and once twisted at the base. Trim. Cat. Ceyl. Pl. 106.

CEYLON; Saffragam district, alt. 4000 ft., Thwaites.

Stem 1-4 in., compressed and leafy at the base; branches ending in a slender peduncle a foot long or less with one or two subulate leaves. Leaves chiefly radical, 1 by \(\frac{1}{2}\) in., rather thick in texture, lanceolate, acute, flat, smooth, margins smooth thickened, cauline convolute; sheath very short, compressed, mouth bearded; ligule truncate. Gl. I and II strongly 3-nerved.—The specimens are insufficient for a satisfactory description. The species is quite unlike any other.

69. POLYPOGON, Desf.

Annual or perennial grasses. Leaves flat. Spikelets 1-fld., minute, jointed (but persistent) on their pedicels, laterally compressed, keeled, densely crowded on the short branches of a spiciform or lobed paniele; rachilla not produced beyond gl. III. Glumes 3; I and II equal, concave, keeled, 2-fld notched or entire, with a slender awn below the tip or in the sinus; III much smaller, hyaline, sessile, truncate, toothed, awned or not; palea small, 2-nerved. Lodicules 2, falcate. Stamens 1-3, anthers small. Ovary glabrous; styles free. Grain obvooid, free within the gl. and palea.—Species few, natives of all warm regions.

1. P. monspeliensis, Desf. Fl. Atlant. i. 66; annual, panicle spiciform oblong or cylindric, gl. I and II oblong scaberulous ciliolate tip obtuse or notched, awn from the sinus or beneath it as long to many times as long as the gl., III 2-toothed shortly awned. Beauv. Agrost. 17, t. vi. f. 8; Mutel Fl. Fr. t. 76, 77; Kunth Enum. Pl. i. 232, Suppl. 181, t. xiii. f. 7; T. Nees Gen. Fl. Germ. Monocot. i. n. 32; Reichb. Ic. Fl. Germ. t. 31; Ledeb. Fl. Ross. iv. 443; Steud. Syn. Gram. 184; Boiss. Fl. Orient. v. 520; Benth. Fl. Austral. v. 546; Doell in Mart. Fl. Bras. II. iii. 44, t. 126; Thw. Enum. Pl. Zeyl. 370, 444; Trim. Cat. Ceyl. Pl. 108; Aitchis. Cat. Paniab. Pl. 165; Duthie Grass. N.W. Ind. 30, Fodd. Grass. N. Ind. 50. P. cruentus, Duthie l.c. (error for crinitus). P. maritimus, Duthie l.c. (not Willd.). P. nepalensis, Nees ex Steud. Nom. Ed. II. ii. 378, Syn. Gram. l.c.; Trin. in Mem. Acad. Petersb. Ser. VI. iv. ii. (1845) 255; Duthie l. c. 30. P. fugax, Nees ex Steud. l. c.; Duthie Fodd. Grass. N. Ind. 51. P. paniceus, Lag. Gen. & Sp. Nov. 3. P. polysetus, Steud. in Flora, xii. (1829) 467. P. zeylanicus, Nees ex Steud. Syn. Gram. 182. Agrostis alopecuroides, Lamk. Illustr. 812. A. crinita, Mænch Meth. 178. A. panicea, Willd. Sp. Pl. i. 128; Engl. Bot. t. 1704; Moon, Cat. Pl. Coyl. 8. A. P Rora, Herb. Ham. ex Wall. Cat. n. 3777 B. A. triaristata, Knapp Grom. Britt. t. 23. Cynosurus paniceus, Linn. Sp. Pl. 73. Phleum crinitum, Schreb. Gram. i. 151, t. 20, f. 3; Sm. Fl. Græc. 1. 46, t. 22; Roxb. Fl. Ind. i. 313. P. monspeliense, Koel. Descr. Gram. 57. Alopecurus aristatus, Gouan Hort, Monsp. 37; Huds. Fl. Angl. 28. Al. monspeliensis, Linn. Sp. Pl. 61. Al. paniceus, Linn. l. c. Ed. ii. 90. Phalaris cristata, Forsk. Fl. Ag. Arab. 17.—Agrostis, Wall. Oat. n. 3777.

Throughout CONTINENTAL INDIA (not seen from Burma and the E. Peninsula). WESTERN TIBET, ascending to 9000 ft., and CEYLON.—DISTRIB. Trop. and Temp.

regions.

Stems tufted, 6 in.-2 ft., stout or slender, leafy, base geniculate, filiform and erect in starved states from Tibet, with very small spikes and very short awas. Leaves 3-6 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., green, ligule oblong. Panicle \(\frac{1}{2}\)-\(\frac{1}{2}\) in. long, \(\frac{1}{2}\)-lin. broad, pale yellowish-green, silky, sometimes lobulate. Spikelets \(\frac{1}{2}\)-\(\frac{1}{2}\) in., very shortly pedicelled. Gl. I and II very variable in breadth, obovate-oblong, sides scaberulous, keels scabrid, margins ciliate, tip entire notched or very shortly 2-fid; awas from the length of the gl. to \(\frac{1}{2}\) in. long, excessively delicate; III very small, oblong.

glabrous, 2-fld, awned or not; palea oblong, tip notched. Anthers very minute, short. Ovary ovoid.—The starved Tibetan specimens are the P. fugax, Nees, they pass insensibly into the larger form. I have not found P. maritimus from any part of India. It may be distinguished by the deeply cleft gl. I and II.

2. P. littoralis, Sm. Compend. Fl. Brit. 13, Engl. Bot. t. 1251; annual or perennial, panicle lobed, gl. I and II subentire or notched, awn twice as long as the gl. or less, III awned or not. Kunth Enum. Pl. i. 233; Reichb. Ic. Fl. Germ. t. 31, vii. t. 75; Steud. Syn. Gram. 184; Benth. Fl. Hongk. 427; Boiss. Fl. Orient. v. 521; Duthie Grass. N. W. Ind. 30. P. elongatum, Lagasc. Gen. & Sp. Nov. 3 (non Kunth). P. Lagasce, Roem. & Sch. Syst. ii. 226; Trin. Diss. 1, 170. P. demissus, Steud l. c. Agrostis littoralis, Knapp. Gram. Britt. t. 22. A. lutosa, Poir. Encycl. Suppl. i. 249; Roem. & Sch. l. c. i. 358. Santia elongata, Parlat. in Webb. Phyt. Canar. Sect. iii. 393.

TEMPERATE HIMALAYA, alt. 4-10,000 ft., from Kashmir to Bhotau and Muunepore. Western Tibet; Iskardo, Thomson.—Distrib. Temp. and subtrop. regions.

Except by the uniformly shorter awns of the spikelets and usually broader lobed panicle, I find it very difficult to distinguish the annual form of this species from the common one of *P. monspeliensis*. In India *P. littoralis* does not descend to the plains, nor does it in the hills assume the filiform starved state of *P. monspeliensis*. In Europe it is always described as perennial, and as usually a littoral plant with a creeping root. The following forms occur in India.

P. littoralis proper; perennial, stem decumbent creeping and rooting below. Var. Higegaweri; annual, stems tutted ascending. P. Higegaweri, Steud. Syn.

Gram, 422; Griseb in Goett. Nachr. (1868) 82.

Var. muticus; perennial, stems creeping and rooting, gls. I and II apiculate, III awnless.—Kunawur, Thomson.

70. SPHEROCARYUM, Nees.

A dwarf annual. Stem creeping and ascending, leafy throughout. Leaves ovate-cordate, acute, amplexicaul. Spikelets 1-fid., very minute, ovoid, pedicelled on the close-set capillary branches of a pyramidal panicle which is sessile in the axil of the uppermost leaf, jointed on the pedicels; rachilla jointed at the base, not produced beyond gl. III. Glumes 3, cymbiform; I and II glabrous, hyaline; I nerveless; Il longest, 1-nerved; III hirsute, 1-nerved; palea as long as the gl., oblong, obtuse, keels distant. Lodicules 2, very minute. Stamens 3, anthers linear. Ovary narrowly ellipsoid; styles short, free. Grain ovoid, free, pericarp adherent to the seed.

S. elegans, Nees ex Steud. Nom. Ed. II. ii. 620. Sphærocarpum elegans, Nees ex Steud. l. c. 256. Grayia elegans, Nees in Wight Cat. n. 2033; Steud. Syn. Gram. 119. G. zeylanica, Arn. ex Steud. Nom. Ed. II. i. 705. Isachne pulchella, Roth. Nov. Sp. 58; Kunth Enum. Pl. i. 136; Thw. Enum. Pl. Zeyl. 362; Trim. Cat. Ceyl. Pl. 104; Benth. Fl. Hongk. 414. Panicum elegans, Wight & Arn. ex Steud. Nom. Ed. II. ii. 256. P. malaccense, Trin. Gram. Panic. 204; Nees Agrost. Bras. 212; Kunth l. c. 113; Miq. Fl. Ind. Bat. iii. 457. P. pulchellum, Spreng. Syst. i. 322. Agrostis malaccensis, Koen. ex Heyne in Herb. Rottl. Andropogon Grayia, Steud. Nom. l. c. i. 91.—Panicum, Wall. Cat. n. 8736.

SILHET and the KHASIA HILLS, in marshes, Wallich, &c. MERGUI, Griffith.

SINGAPORE, Ridley. CEYLON, Macrae, &c .- DISTRIB. China.

Stem 6-12 in., as thick as a spurrow's quill, prostrate and rooting below, then erect, rarely branched, nodes bearded. Leaves all alike in size and form, \$-\frac{1}{2}\$ in. long, acute or acuminate, ciliate-serrulate, subcoriaceous, ecostate, nerves very closeset; sheaths much shorter than the internodes, glabrous or hirsute; ligule of closeset white hairs. Panicle 1-1\frac{1}{2}\$ in., solitary and terminal, with very rarely 1-2 lower on the stem; peduncle very short; concealed in the leaf-sheath; rachis rather stout; branches very many, opposite and alternate, capillary, spreading. Spikelets \frac{1}{20-30}\$ in.—This is undoubtedly Roth's Isachne pulchella. The habit is that of Panicum ovalifolium, Poir, with the leaf-nervation of an Isachne. It differs from Agrostis in habit, and in the spikelets jointed on the pedicels (as in Panices); and from Sporobolus in habit, foliage, and the adnate pericary of the grain.

71. SPOROBOLUS, Br.

Perennial, rarely annual grasses. Leaves flat or convolute. Spikelets small or minute, 1-rarely 2-fld., in effuse or close or spiciform panicles, jointed on their pedicels, awnless; rachilla very short, jointed at the base, not produced beyond the fig. gl. Glumes 3, nerveless or 1-3-nerved, membranous; I and II unequal, persistent or singly caducous; III longer or shorter than I or II, 1-nerved; palea often splitting between the 2 very close nerves. Lodicules very minute or 0. Stamens 2-3, anthers short. Styles short, free. Grain loose within the gl. and palea, pericarp or its epidermis loose, deciduous, rarely adherent.—Species about 80, chiefly tropical.

- * Glumes I and II both much shorter than III.
- 1. **S. diander**, Beauv. Agrost. 25; panicle narrowly pyramidal, branches capillary in scattered fascicles, spikelets $\frac{1}{20}-\frac{1}{18}$ in., gl. I and II hyaline truncate nerveless, grain oblong or obovoid-oblong. Jacq. Eclog. Gram. t. 28; Link Enum. Hort. Reg. Berol. i. 87; Kunth Enum. Pl. i. 213; Wall. Cat. n. 3765; Griff. Notul. iii. 46, Ic. Pl. Asiat. t. 139, f. 85; Dalz. & Gibs. Bomb. Fl. 296; Thw. Enum. Pl. Zeyl. 370; Trim. Cat. Ceyl. Pl. 108; Aitchis. Cat. Panjab Pl. 165; Duthie Grass. N.W. Ind. 29, Fodd. Grass. N. Ind. 40, t. 63; Miguel Fl. Ind. Bat. iii. 375; Benth. Fl. Austral. vii. 622. Vilfa diandra, Wight Cat. n. 1744 (non Trin.). V. erosa, Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat. v. II. (1840) 86; Steud. l. c. 159. V. Retzii, Steud. Nom. Ed. II. ii. 768, Syn. Gram. 162. Agrostis contracta, Herb. Heyne ex Wall. Cat. n. 3765 A. A. diandra, Retz. Obs. v. 19; Roxb. Fl. Ind. i. 317. Panicum secundum, Herb. Heyne ex Wall. l. c.—Sporobolus, Wall. Cat. 3766, 3768.—Sporobolus, Griff. l. c. 44, Ic. t. 149, f. 2.

Throughout India and Burma, ascending the Himalaya to 5500 ft. CEYLON.—

DISTRIB. Asia and Austral. trop.

- Stems 1-3 ft., slender. Leaves densely tufted, 3-10 in., very narrow, flat or convolute, margins entire; ligule a few hairs. Paniele 4-10 in., rachis very slender, sometimes capillary, strict; branches 4-1 in., sometimes flowerless at the base. Spikelets sessile or very shortly pedicelled; gl. I and II not half as long as III, broadly truncate and usually erose; III obtuse or subacute, obscurely 1-nerved. Stamens 2-3. Grain-subtruncate, pericarp rather adherent.
- 2. S. indicus, Br. Prodr. 170; stem stout, panicle very narrow branches short appressed covered to the base with crowded spikelets $\frac{1}{16} \frac{1}{14}$

in. long, gl. I and II obtuse hyaline 1-nerved, III opaque, grain broadly obovoid. Link Hort. Reg. Berol. i. 87; Kunth Enum. Pl. i. 211; Thw. Enum. Pl. Zeyl. 370; Trim. Cat. Ceyl. Pl. 108; Duthie Fodd. Grass. N. Ind. 49; Benth. Fl. Hongk. 426, Fl. Austral. vii. 622; Griseb. Fl. Brit. W. Ind. 533. S. angustus, Buckl. in Proc. Acad. Sc. Philad. (1862) 88. S. clongatus, Br. Prodr. 170; Hook. Handb. N. Zeal. Fl. 327; Miq. Fl. Ind. Bat. iii. 376; Duthie Grass. N.W. Ind. 29. S. Lamarckii, Desv. in Ham. Prodr. Fl. Ind. Occ. 4. S. minor, Kunth Enum. Pl. i. 212. S. tenacissimus, Beauv. Agrost. 26; Kunth l. c. 212, Suppl. 167; T. Nees Gen. Fl. Germ. Monoc. i. n. 28; Duthie Fodd. Grass. N. Ind. 49. Vilfa capensis & elongata, Beauv. Agrost. 16; Trin. Gram. Diss. i. 154; Steud Syn. Gram. V. exilis, Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat. v. II. (1840) 89; Steud. l.c. 159. V. indica, Trin. ex Steud. Nom. Ed. II. ii. 767, Syn. Gram. 162; Baker Fl. Maurit. 449. V. tenacissima, H. B. & K. Nov. Gen. & Sp. i. 138; Nees Agrost. Bras. 393; Trin. Sp. Gram. Ic. t. 60; Steud. l. c. 160. P. rupestris, Trin. Diss. ii. 22; Steud. l. c. 161. Agrostis elongata. Lamk. Illustr. i. 142. A. fertilia, Steud. l. c. 170. A. indica, Linn. Sp. Fl. 63. A. tenacissima, Jacq. Collect. i. 85, Ic. Rar. 3, t. 16 (excl. Syn.). A. tenuissima, Spreng. Syst. i. 258.—Sporobolus, Wall. Cat. n. 3766, B. 3767.

Throughout India, ascending the Himalaya to 5000 ft., Burma and Ceylon.—Distrib. All warm countries.

Stem 2-3 ft., sometimes as thick as a small goose-quill at the base. Leaves 8-24 in., convolute or flat, rarely \(\frac{1}{2}\) in. diam., margins smooth; ligule a few hairs. Panicle 6-18 in., often interrupted; rachis stout, erect, or curved; branches erect, \(\frac{1}{2}\) in. or longer, often whorled, densely clothed usually to or to near the base with green spikelets, which are erect and imbricate. Spikelets larger than in S. diander. Gl. I = about \(\frac{1}{2}\) II; II not twice as long; III acute. Pericarp adherent.—It is not always easy to distinguish this from S. diander, which is much the most common in India. In its normal state indicus is a far more robust plant, with a stout rachis and branches of the panicle, larger and more herbaceous more crowded spikelets, and a broader grain; but both vary greatly in the panicle.

3. S. minutiflorus, Link Enum. Hort. Berol. i. 88; tall, slender, leaves long, paniole very large effuse supra-decompound, branches capillary, spikelets $\frac{1}{80}$ in., gl. I minute subquadrate, II = $\frac{1}{8}$ III orbicularovate obtuse, grain broadly obvoid. Kunth Enum. Pl. i. 214. Vilfa capillaris, Wight & Arn. ex Wight Cat. n. 2036 (non Miq). V. minutiflora, Trin. Diss. i. 158; Steud. Syn. Gram. 158. V. mangalorica, Hochst. ex Miq. Analect. Bot. ii. 24; Steud. l. c. 159. V. tenuissima, Schult Mant. ii. 479. Panioum tenuiflorum, Hort. Monac. ex Link. l. c. P. tenuissimum, Mart. ex Schrank in Denkschr. Bot. Ges. Regensb. ii. (1922) 26.

The DECCAN PENINSULA, Wight. CANABA, Hohenacker.

Stem 2-3 ft. Leaves narrow, flat, finely acuminate, margins quite smooth; ligule of minute hairs. Panicle 12-18 in., erect; rachis quite smooth, very slender; branches innumerable, 1-2 in., spreading, and branchlets excessively slender, flowering at the tips. Spikelets ellipsoid, dark colrd.; gl. I truncate; II broadly ovate, obtuse, nerveless; III ovate-oblong, obtuse, nerveless; palca shorter, broad, truncate. Stamens 2.

4. S. Wallichii, Munro mss.; very tall, erect, leaves long, panicle tall oblong or subpyrsmidal decompound branches capillary, branchlets divaricate few-fld., spikelets $\frac{1}{10}$ in., gl. I minute truncate, II = $\frac{1}{2}$ III or

longer ovate acuminate, grain broadly obliquely obcordate. Sporobolus, Wall. Cat. n. 3769 A.

BEHAR; Rajmahal Hills, Wallich. PEGU, Kurs. CEYLON; between Trinco-

malee and Kantalla, Ferguson.

Perennial? Stein 3-4 ft., as thick as a crow-quill, strict, sparingly leafy. Leaves 1-2 ft. by \(\frac{1}{4}\) in., quite smooth; upper sheaths very long; liquid 0. Panicle 12-18 in. by 4-5 broad, branches opposite and whorled, branchlets flowering towards the tips. Spikelets pale brown; gls. II and III faintly 1-nerved; palea oblong, truncate, as long as its gl. Stumens 3.—Habit of S. minutiflorus, but spikelets very different.

5. S. ioclados, Nees Fl. Afr. Austral. 161; leaves short, panicle oblong or subpyramidal effuse, branches capillary, spikelets $\frac{1}{16}$ $\frac{1}{12}$ in. scattered, gl. I lanceolate = $\frac{1}{3}$ III, II = $\frac{3}{4}$ III oblong-lanceolate obtuse, grain linear-oblong truncate. Vilfa ioclados, Nees ex Trin. in Mem. Acad. Petersb. Ser. VI. Sc. Nat. v. II. (1840) 65.

SCIND. Stocks .- DISTRIB. S. Africa.

Stems 10-18 in., densely tufted, rather stout. Leaves 2-3 in., narrow, densely tufted, sheath short; ligule obscure. Panicle 3-7 in., branches opposite and alternate, spreading. Spikelets oblong, pale.—A very elegant grass.

** Glume I as long as III or nearly so. Panicle contracted.

6. S. virginicus, Kunin Revis. Gram. i. 67, Enum. Pl. i. 210, Suppl. 167; stems erect from a decumbent woody creeping base, leaves strict distichous convolute pungent, panicle elongate narrow interrupted branches very short, spikelets $\frac{1}{10}$ $\frac{1}{15}$ in. subsessile crowded, gls. I and II oblong-lanceolate acute, I shorter than II, grain broadly obovoid. Trim. Cat. Ceyl. Pl. 108; Benth Fl. Austral. vii. 621; Griseb. Fl. Brit. W. Ind. 533. S. littoralis, Kunth l. l. c. c. 68, 213. Vilfa barbata, Beauv. Agrost. 16. V. littorslis, Beauv. l. c.; Steud. Syn. Gram. 162. V. murina, Sieb. ex Steud. l. c. 157. V. orientalic, Wight Cat. n. 1745 (in part). V. virginica, Beauv. l. c.; Trin. Diss. i. 155; Sp. Gram. Ic. t. 48; Steud. l. c. 157; Baker Fl. Maurit. 449. Agrostis barbata, Pers. Syn. i. 75. A. littoralis, Lamk. Illustr. 161. A. pungens, Pursh Fl. Am. Sept. 64. A. virginica, Linn. Sp. Pl. 63; Labill. Pl. Nov. Holl. i. 20, t. 23. Podosemum virginicum, Link Enum. Hort. Berol. i. 85. Calotheca sabulosa, Steud. in Flora, xii. (1829), II. 488. Crypsis maritima, Munro ex Macowan in Cape Monthly Mag. N.S. iii. (1871), Suppl. 7.

CEYLON; common on the shores, Heyne? Trimen.—DISTRIB. Westwd. to tropical

Africa and America; eastwd. to Australia.

Perennial. Stem as thick as a duck's quill, branched, hard and often tortuous at the base, then erect or ascending 6-10 in. high. Leaves close-set, erecto-patent, 1-3 in. long or more, narrow and almost terete from the involute margius, very pale, glabrous or scaberulous above, striate; sheaths terete, short or long; ligule of long soft hairs. Panicle 1-4 in., subspiciform, very pale, narrow but more or less interrupted. Spikelets very shortly pedicelled; gls. all 1-nerved, keels glabrous or obscurely scabrid towards the tip; palea oblong, narrowly truncate. Grain with the pericarp loosened if moistened.—Trinius' figure represents gl. I as shorter than in the Ceylon specimens and others that I have examined. It is remarkable that this grass should have no certain habitat on the shores of continental India. There is a specimen from Heyne in Rottler's herbarium, marked "Nawülus, 21st Aug., 1794," a word which sounds more Cingalese than Indian. There is another in Wight's herbarium, where S. orientalis, spicatus, tremulus and virginious are all fastened on the same sheet as No. 1745. S. pungene, Kunth, of the Mediterranean

region, from Spain to Egypt and Arabia, is a slight variety with a stouter dense panicle, which Dr. Stapf and I have independently sought in vain to distinguish by any other character, and this is of the slightest.

7. S. glaucifolius, Hochst. in Flora, xxv. (1842) I. Bieb. 123; slender, glaucous, leaves short strict narrow lat or undulate glaucous not pungent, panicle elongate contracted white, branches very short erect, spikelets 1/3 in. subsessile crowded, gls. I and II subequal ovatelanceolate acuminate as long as III or rather longer. Vilfa glaucifolia Steud. Syn. Gram. 154. V. scabriolia, Hochst. ex Edgew. in Journ. Linn. Soc. vi. (1862) 196; Aitchis. Cat. Panjab Pl. 165. Agrostis barbata, β, senegalensis, Pers. Syn. i. 76. A. littoralis β, Lamk. Illustr. 161; Poir. Encycl. Suppl. i. 251.

The PANJAB. Dehra Ismael Khan, Duthie; Multan, Edgeworth. Scind, Stocks. —DISTRIB. Afr. trop.

Perennial; stems 12-18 in., densely tufted. Leaves 2-5 by \(\frac{1}{10}\)-\frac{1}{8} in., narrowed from the cordate base to the finely acuminate tip, margins smooth, somewhat hairy towards the base; ligule a ridge of minute hairs. Panicle 3-5 in., interrupted, very pale yellowish. Spikelets very shortly pedicelled; gls. all 1-nerved; I and II hysline, puncticulate; I rather shorter and narrower than II.—Of the synonymy cited above that of V. littoralis β, and the two sp. of Agrostis are taken from J. Gay's mss. on a Senegal specimen in Herb. Kew. Of V. scabrifolia I know nothing, nor where Edgeworth gets the name (which is not in the "Kew Index," but from his citing Stock's number (667) as the same plant, there is no doubt that S. glaucifolius is that meant. Edgeworth (l. c. 182) mentions this amongst other plants of which the seeds are swept up for food by the poorer classes of the desert.

- *** Glume I shorter than II and III.
- † Panicle contracted. Perennials, except S. piliferus.
- 8. S. tremulus, Kunth Revis. Gram. i. 67, Enum. Pl. i. 210, Suppl. 166; stoloniferous, leaves short subulate or filiform flat or convolute pungent margins smooth, spikelets $\frac{1}{16}$ in., gl. I shorter than III lanceolate, II as long as III or longer, grain oblong. S. geniculatus, Nees ex Aitchis. Cat. Panjab Pl. 165. S. orientalis, Trim. Cat. Ceyl. Pl. 108 (non Kth.). Vilfa geniculata, Nees ex Steud. Syn. Gram. 156; Herb. Wight n. 3307. V. orientalis, Wight Cat. n. 1745 (in part). V. tremula, Trin. Diss. i. 155; Steud. l. c. 160. Agrostis junces, Lamk. Encycl. i. 60, Illustr. t. 41, f. 2. A. Phuldubha, Herb. Ham. ex Wall. Cat. n. 3770. A. tenacissims, Roxb. Fl. Ind. i. 316 (excl. Syn.). A. tremula, Willd. Sp. Pl. i. 372 (excl. Syn.). Zoysia? tremula, Beauv. Agrost. 148.—Sporobolus, Wall. Cat. n. 3770, 3771.

Plains of India, from the Panjab to Bengal and southwd. Prou, Kurs.

CEYLON, Trimen. - DISTRIB. Tonkin, Cambodia.

- Stems 2-6 in., many from a hard knotted stoloniferous stock, erect or prostrate, wiry; stolons 6-18 in., stout or slender, leafy, flexuous. Leaves \(\frac{1}{2}\)-2 in., rigid, narrowed from the usually hairy base to the tip; ligule a few hairs. Panicle 1-4 in., subspiciform, sometimes longer flexuous and interrupted, branches short rarely a few spreading; pedicels short. Spikelets crowded, subpersistent on the very short pedicels, very pale; glumes all 1-nerved; palea as long as its gl. Stamons 3.—A very common and variable pasture grass. Vilja geniculata is a large state from Madras, with almost woody stems 12-18 in. long and flat leaves.
- 9. S. spicatus, Kunth Revis. Gram. i. 67, Enum. Pl. i. 210; stoloniferous, leaves short rigid, panicle slender cylindric, spikelets 15 in.,

gl. I minute, II lanceolate acute, grain obliquely oblong. Boiss. Fl. Orient. v. 512. S. orientalis, Herb. Wight n. 3303, 3304, Cat. n. 1745 (in part). Vilfa spicata, Beauv. Agrost. 16; Trin. Diss. 1, 152, Sp. Gram. Ic. t. 12; Steud. Syn. Gram. 160: PAgrostis involuta, Poir. Encycl. Suppl. i. 252. A. spicata, Vahl Symb. i. 9; Del. Fl. Ægypt. 20, t. 10. f. 1. A. virginica, Forsk. Fl. Æg. Arab. 20 (ex Kunth).—Sporobolus, Wall. Cat. n. 3773.

The DECCAN PENINSULA, Heyne; Palamcottah, Wight.—DISTRIB. Arabia, Egypt, trop. Africa.

Stem 6-12 in., from a hard stoloniferous rootstock, stiff, strict above the geniculate base. Leaves 1-2 in., divaricate, pungent, scabrid above; ligule 0. Panicle spiciform, 2-3 in. by \(\frac{1}{10}\)-\frac{1}{2} in. diam. Spikelets sessile, persistent on the branchlets, pale, Glumes hyaline, I rounded; III 1-nerved; III ovate-lanceolate; palea as long as the gl. Grain obliquely oblong or orbicular-oblong.—Agrostis involuta, Poir., referred here by Sprengel, is a Marocco plant, which may be S. virginicus or pungens.

10. S. orientalis, Kunth Enum. Pl. i. 211; stoloniferous, leaves pungent, margins serrulate, panicle narrowly oblong, spikelets $\frac{1}{12}$ in., subsessile, gl. I = \frac{1}{2} II or shorter tip rounded, II = III or longer obtuse, grain obovoid. Dalz. & Gibs. Bomb. Fl. 295. S. humifusus, Trim. Cat. Ceyl. Pl. 108 (non Kunth). Vilfa diandra, Trin. Diss. i. 154 (excl. Syn. Retz.). V. orientalis, Nees ex Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat. v. II. (1840), 65; Wight Cat. n. 1745 (in part); Steud. Syn. Gram. 156. Agrostis elongata, Roth. Nov. Sp. 41. A. orientalis, Nees Agrost. Bras. 393 (excl. Syn. Roxb.). A. pungens, Herb. Heyne ex Wall. Cat. n. 3772. A. tenacissima, Linn. f. Suppl. 107 (excl. Syn. Jacq.).—Sporobolus, Wall. l. c.

The DECCAN PENINSULA, Heyne, Wight. CEYLON, at Calpentyn, Trimen.

Stem 6-18 in., base stout, hard, branching, branches and flowering stems usually geniculate below. Leaves very variable, 1-6 in., subcrect or spreading, more or less pungent, glabrous or hairy above; ligule 0. Panicle 1½-4 in., erect, subspiciform or more open with here and there short horizontally spreading branches that are naked below, usually pale. Spikelets closely packed; gl. I nerveless, II and III 1-nerved.—The Ceylon and Heyne's specimens are 12-18 in. high with long flat leaves and narrow open panicles, Wight's are shorter and stouter with spiciform panicles, and closely resemble states of S. tremulus, from which the short obtuse gl. I at once distinguishes it. Although in Herb. Wight Prop. the four species mentioned in the notes to S. virginicus are all included under No. 1745, S. orientalis, the latter alone bears that number in Herb. Hook. and Herb. Bonth.

11. S. piliferus, Kunth Enum. Pl. i. 211 (var. a); annual, leaves hairy serrulate, panicle linear branches very short erect, spikelets \(\frac{1}{20} - \frac{1}{6} \) in., gl. I \(\frac{1}{2} - \frac{3}{4} \) III lanceolate, II longer than III oblong-lanceolate, III oblong, grain oblong compressed. S. ciliatus, Munro in Herb. Ind. Or. Hf. & T.; Duthie Grass. N.W. Ind. 29 (non Vilfa ciliata, Presl.). Vilfa pilifera, Trin. Diss. i. 157, ii. 23, Sp. Gram. Ic. t. 58. Triachyrum nilagiricum, Steud. in Hohen. Pl. Ind. Or. n. 931.—Sporobolus, Wall. Cat. n. 3774.

WESTERN HIMALAYA; from Kashmir to Nepal, alt. 3-8000 ft., Wallich, &c. The Khasia Hills, alt. 5000 ft. Mysore, at Belgaum, Ritchie. NILGHIRI

HILLS, Wight, &c. MALACCA, Hervey.

Stems 3-12 in., densely tufted, erect, roots fibrous. Leaves 1-4 in., chiefly radical, narrowed from the base to the tip, flat or convolute, sparsely nairy above and at the mouth of the sheath, margins serrulate below or nearly to the tip; ligule 0. Panicle 1-3 in., strict, erect, dense-fld., often interrupted. Spikelets brown; gl. I nerveless; II and III 1-nerved, callus minute; pulea oblong. Stamens 2, anthers very short.—Trinius figures this plant from a Brazilian and a Nepalese specimen.

The latter from Wallich is a very dwarf form, which is not uncommon in the Himalays. The Brasilian is Kunth's β . major, is a much larger specimen, and may or may not be specifically the same. S. ciliatus, Presi, to which S. piliferus was referred by Munro, is a Panama plant, and is, I think, from the description different.

- †† Panicle open, effuse.
- 12. S. arabicus, Boiss. Diagn. Pl. Or. Ser. I. xiii. 47; perennial, stems many from a woody stoloniferous base, leaves rigid narrow, panicle pyramidal, spikelets in crowded subsessile at the ends of the branches, gl. I minute ovate, II ovate-oblong acute as long as III. S. pallidus, Boiss. Fl. Orient. v. 514 (non Lindl.); Aitch. Cat. Panjab Pl. 165 (excl. Syn.) Pluthie Grass. N.W. Ind. 29, Fodd. Grass. N. Ind. 50. Vilfa pallida, Ness ex Trin. in Mem. Acad. Petersb. Ser. VI. Sc. Nat. v. ii. (1840) 62; Steud. Syn. Gram. 155. V. arabica, Steud. l.c. 241.

PANJAB PLAINS; Royle, &c. WAZURISTAN, ascending to 7000 ft., Stewart-

ROHILKUND, Duthie. SCIND, Stocks .- DISTRIB. Arabia, Beluchistan.

Woody base of the stem sometimes as thick as the middle finger, sending out rigid often geniculate stolons, and stout or slender flowering branches 6-24 in. high. Leaves 1-10 in. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., narrowed from the rounded base to the tip, flat or convolute, scaberulous above, finely ciliate-serrulate; ligule 0. Panicle 2-6 in. long, branches whorled, capillary, naked below. Spikelets subspicate on the branchlets, oblong, pale; gl. II and III obtuse, 1-nerved; palea as long as its gl. Grain subglobose.—The synonymy of this plant is perplexing, owing to the double use of the specific name pallidus, and to the fact of Vilfa being now regarded as a synonym of Sporobolus. This name (pallidus) was applied by Nees in 1840 to the Arabian plant described above, under Vilfa; and by Lindley in 1848 to a very different Australian one, under Sporobolus. Bentham (Fl. Austral. vii. 623) assuming that Nees had referred his plant to Sporobolus, renamed Lindley's S. Lindleyi. Lastly, Boissier, when he founded his S. arabicus, was not aware that it was Trinius's Vilfa pallida, which he erroneously cites in Fl. Orient., under Sporobolus pallidus, Trin. In this case the proper course appears to me to be to retain the name Sp. pallidus, Lindl., for the Australian plant, and Sp. arabicus, Boiss., for the Arabian and Indian.

13. S. pulchellus, Br. Prodr. 170; annual, slender, leaves narrowly lanceolate flat spinulosely serrulate, panicle oblong, branches whorled capillary few-fld towards the tips, spikelets $\frac{1}{2^{\circ}}$ in shortly pedicelled, gl. $1 = \frac{1}{2}$ II obtuse, keels of both ciliate, II = III broadly ovate acuminate. Kunth Revis: Gram. ii. 106, t. 123, Enum. Pl. i. 215, Suppl. 171; Benth. Fl. Austral. vii. 623. S. capillaris, Arn. ex Miq. Ann. Bot. Ind. II. 25 (non Vilfa capillaris, Wt. & Arn.). Vilfa pulchella, Trin. Diss. i. 160. Agrostis pulchella, Roth. Nov. Sp. 41. Panicum montanum, Ham. ex Wall. Cat. n. 8883.—Sporobolus, Wall. l. c.

Behab, Wallich, Thomson. Chota Nagfore, Clarke.—Distrib. Australia.

Stem 6 in.-2 ft., filiform or capillary, strict, erect from the base or nearly so, distantly leafy. Leaves 2-5 in., gradually narrowed from the rounded base to the finely acuminate tip, margins with tubercle-based cilia below; ligule O. Panicle 2-6 in., loose, whorls of many branches at regular intervals. Spikelets reddishbrown? glumes almost hyaline, obtuse. Grain globose; pericarp loose, hyaline.—Bentham observes that Kunth's figure is of an unusually narrow-leaved form with the remarkable cilia not represented.

14. S. coromandelianus, Kunth Revis. Gram. i. 681, Enum. Pl. i. 213; annual, leaves lanceolate flat spinulosely serrulate, panicle pyramidal branches whorled capillary, spikelets 10 in., gl. I minute

oblong or lanceolate, II = III both ovate-lanceolate scuminate. Dalz. & Gibs. Bomb. Fl: 296; Trim. Cat. Ceyl. Pl. 208; Wall. Cat. n. 3764. S. commutatus, Kunth Enum. i. 214; Miq. Fl. Ind. Bat. iii. 376 (excl. Syn. pulchellus); Boiss. Fl. Orient. v. 513; Aitch. Cat. Panjab Pl. 165; Duthie Grass. N.W. Ind. 29. S. discosporus, Nees Fl. Afr. Austr. 158. Vilfa commutata, Trin. Diss. i. 156; Wight Cat. n. 1743. V. coromandeliana, Beauv. Agrost. 15; Trin. Sp. Gram. Ic. t. 11 (gl. I omitted); Steud. Syn. Gram. 153. V. discospora, Trin. in Mem. Acad. Petersb. Ser. VI. Sc. Nat. ii. (1841) 59. V. Roxburghii, Nees ex Trin. l. c. V. Roxburghiana, Nees ex Wight Cat. n. 1742; Steud. Nom. Ed. II. ii. 59. Triachyrum cordofanum, Hochst. ex Steud. Syn. Gram. 176. T. discosporum, Steud. l. c. Agrostis coromandeliana, Retz. Obs. iv. 19; Vahl Symb. i. 10; Roxb. Fl. Ind. i. 316. A. indica, Forsk. Fl. Æg. Arab. 104. A. Rura, Hb. Ham. ex Wall. l. c. B.

Plains of India, from the Punjab eastward to Burma, and southward to CEYLON.

-DISTRIB. Afighan. N. and S. Africa. (Texas and Mexico, introd. ?).

Stems many, 4-12 in., spreading from the root, leafy. Leaves 1-3 by 1-3 in., narrowed from the subcordate base to the finely acuminate tip, spinulosely toothed especially towards the base; mouth of sheath villous. Panicle very large for the size of the plant, 2-6 by 1-4 in., branches 4-6 in subsecund whorls, 1-2 in. long, branchets drooping 1-2-fid. Spikelets subglobose; glumes hyaline, all 1-nerved or I nerveless. Stamens 2, anthers very short. Grain obliquely oblong or subglobose.—Nees Fl. Afr. Austr. refers Agrostis pulchella, Roth., to Sp. commutatus, as var. 6. Trinianus, Arn. et Nees Glum. Ind. Or. ined., with panicle ovate and gl. I 5-6 times shorter than commutatus.

Var. Collettii; panicle narrowly pyramidal or conical 2-3 in. long by 1-11 in.

across the lower branches, spikelets bright red-brown.—Shan Hills, Collett.

DOUBTFUL SPECIES.

Vilfa rigidifolia, Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat. v. II. (1840) 80.— E. Indies, Herb. Thouars.—Described by Trinius as having spikelets 2 (French) lines long, which is twice as long as any Indian species known to me.

72. AGROSTIS, Linn.

Perennial, rarely annual grasses. Leaves usually flat. Spikelets small, 1-fld., in effuse or contracted panicles with capillary whorled branches, not jointed on their pedicels; rachilla not produced beyond gl. III. Glumes 3, I and II equal or unequal (sub-awned in A. subaristata), keeled, 1-rarely 3-nerved; III membranous, 5-nerved, truncate, glabrous, awn dorsal or 0, callus glabrous or with few minute hairs; palea nearly as long as its gl. or shorter or 0, 2-nerved or nerveless. Lodicules 2. Stamens 3, anthers long or short. Grain free within the gl.—Species about 100, chiefly in N. temp. regions.

The genera Agrostis, Calamagrostis, and Deyeusia are, as all authors agree, separated by artificial characters and are not well limited by these. It therefore becomes a question of expediency how to limit them, and the addition of many hitherto undescribed Himalayan species has not tended to aid this operation. Many authors make of Deyeusia a section of Calamagrostis. Bentham keeps them distinct, but confines Calamagrostis to species with gl. I and II longer than III. After much study, I conclude that for taxonomic purposes, the most practical arrangement is to confine Agrostis to species with no elongation of the rachilla, and a naked or almost naked callus of gl. III (a character appreciated by most authors); to refer to Calamagrostis those with a villous callus but with no elongation of the rachilla,

and to Deyeuxia, those with both a villous callus and the rachilla elongate beyond gl. III and (with a few exceptions) penicillate. I know of no species of Agrostis with the last-mentioned character of Deyeuxia, but there are species of Agrostis with longer hairs than normal in the callus, and of Calamagrostis with shorter hairs than normal; there are also species of the latter genus with a minute elongation of the rachilla, and of Deyeuxia in which that organ is short. There is no Indian Agrostis except A. myriantha with the tall coarse habit of several species of Calamagrostis and Deyeuxia, but many species of these two genera have the slender habit of Agrostis, and can only be distinguished from it by the minute characters given above. The species of Calamagrostis with the gl. III hairy all over form a peculiar section, well limited by this character; their habit is altogether that of Agrostis.

- * Palea half as long as gl. III or longer, rarely minute.
- 1. A. alba, Linn. Sp. Pl. 63; ligule oblong, flowering panicle spreading fruiting contracted, branches nearly smooth, spikelets $\frac{1}{12}$ in., gl. I and II subequal acute, III about $\frac{1}{4}$ shorter rarely awned, tip truncate crenate, callus quite glabrous. Kunth Enum. Pl. i. 219, Suppl. 175; Boiss. Fl. Orient. v. 514; Schrad. Fl. Germ. t. 2; Fl. Dan. x. t. 1623; Engl. Bot. t. 1189; T. Nees Gen. Fl. Germ. Monoc. i. n. 29; Reichb. Ic. Fl. Germ. t. 33-36; Ledeb. Fl. Ross. iv. 436; Aitchis. Cat. Panjab Pl. 165; Duthie Grass. N.W. Ind. 29. A. diffusa, Host Gram. Austr. iv. t. 55. A. Michauxii, Herb. Strach. & Winterb. A. mutabilis, Knapp Gram. Britt. t. 28. A. Wightii, Schmid. Coll. Pl. Nilgh.; Herb. Wight Propr. 1746 (in part). A. Royleana, Trin. Agrost. ii. 125.

WESTERN HIMALAYA and WESTERN TIBET, alt. 6-11,500 ft., from Kashmir to Kumaon. Sirkim, alt. 7500 ft. (introd.?). NILGHIRI HILLS (introd.).—DISTRIB. N. temp. regions.

Stems 1-3 ft., stoutly ascending from a tufted base, erect, slender. Leaves rather short, flat, nearly smooth; ligule variable in length. Panicle 2-8 in. long, pyramidal. Spikelets green or purplish, usually shining; palea = about \(\frac{1}{2}\) of gl. III.—The above description applies to the common Himalayan form of A. alba, and accords with the European. I have not cited its multitudinous synonyms, of which 50 are recorded in the "Kew Index," for many apply to obscure forms or varieties none of which occur in India; except var. stolonifera (A. stolonifera, Host Gram. Austr. t. 57) of which there are Nilghiri specimens, but no doubt introduced. The awned variety \(\gamma\). aristata, Boiss. 1. c., a widely distributed European, American, and Asiatic plant is noted as Tibetan by Boissier, but I have seen no specimens. It is a tall form with broad leaves. Boissier describes the branches of the panicle as rough in alba, but they are smooth in all Indian specimens. Wight's n. 1746 has a minute palea.

2. A. verticillata, Vill. Fl. Delph. 74; leaves scabrid, ligule very short truncate, panicle ovate or oblong contracted or expanded dense fld., branches scabrid, spikelets $f_{\mathbf{x}}^{\mathbf{x}}$ in., gls. I and II subequal subacute scaberulous keels strongly scabrid, III about $f_{\mathbf{x}}^{\mathbf{x}}$ shorter not awned tip truncate toothed, palea nearly = gl., callus quite glabrous. Ledeb. Fl. Ross. iv. 438; Boiss. Fl. Orient. v. 513; Trin. Diss. i. 195, Sp. Gram. Ic. t. 36; Reichb. Ic. Fl. Germ. t. 35. A. adscendens, Lange in Kjoeb. Vidensk. Meddel. (1860) 33. A. anatolica, C. Koch. in Linnæa, xxi. (1848) 379. A. densa, Bieb. Fl. Taur. Cauc. i. 56. A. diffusa, Bess. Prim. Fl. Gallic. i. 68. A. Muelleri, Presl Bot. Bemerk. 120. A. refracta, Moench. Meth. Suppl. 60. A. stolonifera, Linn. Herb. non Sm.; Bieb. l. c. iii. 62 (ex Ledeb. l. c. 439). A. Villarsii, Poir. Encycl. Suppl. i. 251.

The Panjab; Hurss, Aitchison. Kashmin; Chittapani Valley, Levinge. Simla, alt. 2-4600 ft. (Griseb.).—Distrib. N. temp. regions.

Stem long slender creeping, then ascending to 10-15 in. high. Leaves rather

broad. Panicle 2-3 in., lobed, branches very short with densely fastigiate branchlets, and crowded very shortly pedicelled green spikelets.—Described as annual by Grisebach in Ledeb. Fl. Ross., but as perennial by other authors.

3. A. subaristata, Aitch. & Hemsl. in Journ. Linn. Soc. xix. (1882), 192, t. 29; leaves scabrid, ligule long, panicle elongate contracted or subeffuse, branches short scaberulous, spikelets $\frac{1}{13}$ in., gl. I and II subequal scaberulous tips aristulate, keels scabrid, III about $\frac{1}{3}$ shorter, tip truncate toothed, awn 0 or minute, palea nearly as long as the gl., callus quite glabrous. Boiss. Fl. Orient. v. 514.

KASHMIR, Falconer; at Sreenuggur and Nowgunji, alt. 5-6000 ft., Clarke .-

DISTRIB. Aflghanistan.

Stem long creeping and rooting below (as in vulgaris) then ascending, stout or slender. Panicle 3-6 in., dense- or lax-fld., branches flowering to the base. Spike-lets pale, very shortly pedicelled, often densely packed. Gl. I and II membranous, with the median nerve sometimes produced into a very short awn; III dorsally awned in Affghan specimens.—Apparently a very distinct species, strongly resembling A. vulgaris in habit; the awned gl. I and II are found in no other Indian species. The Affghan specimens have larger and more scabrid subhispid spikelets.

4. A. peninsularis, Hook.f.; tall, very slender, erect, leaves very narrow strict, ligule short, panicle as broad as long very lax and open, branches 2-4-nate and branchlets long capillary simple in the lower half or more then very sparingly branched and few-fid., spikelets i in., gl. I and III subequal, III nearly = II strongly 4-nerved tip truncate 2-aristulate, awn basal exserted, callus very shortly bearded, palea = gl. III lanceolate 2-nerved, anther as long as the gl. A. Hookeriana, Herb. Wight.

DECCAN PENINSULA, Wight (Cat. n. 1746, in part); ? Pulney Mts., Wight. Stem 2 ft. or more, erect from the very base, stiff, leafy upwards. Leaves flat, 3-4 by 1 in., erect, finely acuminate, nearly smooth. Panicle 3-4 in., branches in distant whorls, perfectly smooth. Spikeles green or purple. Anthers very large, purple, tips of cells almost boaked.—The Pulney plant has narrower more acuminate gl. I and II than the others, and III is shorter in proportion, but it is otherwise identical; its stamens are imperfect. Closely resembles Calamagrostis pilosula.

- ** Palea short or 0.
- + Gl. III awned.
- 5. A. canina, Linn. Sp. Pl. 62; radical leaves narrow convolute cauline very narrow, ligule oblong, panicle oblong or ovate spreading in fl. contracted in frt., branches lax-fid., spikelets $\frac{1}{12} \frac{1}{10}$ in., gl. I and II unequal lanceolate acute or acuminate, III $\frac{1}{4}$ shorter tip truncate 4-toothed, uwn median to basal, palea 0, callus glabrous, anthers long. Kunth Enum. Pl. i. 222; Host Gram. Austr. iv. t. 53; Engl. Bot. t. 1856; Knapp Gram. Britt. t. 21; Reichb. Ic. Fl. Germ. t. 33; T. Nees Gen. Fl. Germ. Monocot. i. n. 29; Duthie Grass. N.W. Ind. 29; Ledeb. Fl. Ross. iv. 440; Boiss. Fl. Orient. v. 516. Trichodium caninum, Schrad. Fl. Germ. i. 198. Agraulus caninus, Beauv. Agrost. 5, t. 4, f. 7.

WESTERN HIMALAYA and WESTERN TIBET; Kashmir, alt. 9-12,000 ft., Clarke, Duthie; Lahul, Hay. NILGHIEI HILLS, alt. 8000 ft., Clarke (introd.?).—DISTRIB. N. temp. regions.

Stem 1-2 ft. very slender, rarely stoloniferous. Leaves \(\frac{1}{16-10}\) in. broad. Panicle 2-1 in.; branches capillary, scaberulous or nearly smooth. Spikelets green, pale or purple; awn exserted, geniculate; callus sometimes minutely scabrid.—There are upwards of 80 recorded synonyms of this plant.

6. A. brachiata, Munro mss.; tall, very slender, leaves long, ligule very small, panicle effuse, branches branchlets and pedicels capillary divaricate, spikelets $\frac{1}{16}$ in. few distant very long-pedicelled, gl. I and II subequal oblong subacute, III nearly as long narrowly truncate, callus quite glabrous, awn median.—Sporobolus, Wall. Cat. n. 3769 B.

BEHAR; at Monghyr, Wallich.

Stem 2-3 ft. high or more, as slender as a sparrow's quill, weak and probably decumbent on bushes, internodes 6 in. long. Leaves 6-8 by \(\frac{1}{2}\) in., finely acuminate, contracted towards the base, thin and flaccid. Panicle 6-12 in., quite smooth, branches 2-2\) in. long, opposite or in distant whorls of 3-5, horizontal; pedicels \(\frac{1}{2}\)-\\
in. Gl. I and II equal, cymbiform; III as long as I and II, 5-nerved, mid-nerve reaching half way up; palea minute. Grain oblong, compressed, as long as the gl.—An extraordinarily delicate species, quite unlike any other and more resembling a Sporobolus. The specimens are advanced, in frt., and I have seen no awn, or any other indication of one except the shortened median nerve.

7. A. filipes, Hook. f.; very slender, leaves short very narrow, ligule very short, panicle very narrow elongate, branches short alternate and 2-3-nate erect smooth, spikelets $\frac{1}{14} - \frac{1}{13}$ in. shortly pedicelled erect, gl. I and II unequal acute, III $\frac{1}{3}$ shorter tip truncate nearly entire, callus quite glabrous, awn dorsal from above the middle geniculate, palea minute.

KHASIA HILLS, alt. 5-6000 ft., in several places, Clarke.

Stem 8-15 in., erect or geniculate below, densely tufted, base hard. Radical leaves many, tufted, 1-2 in., subulate, cauline rather longer and broader. Panicle 2-4 in., interrupted; branchlets \(\frac{1}{2}\)-\frac{1}{2} in., capillary, shortly naked below, smooth. Spikelets green or pale reddish; gl. I and II with scabrid keels; awn shortly exserted. Anthers very short. Grain ovoid, acute.—Nearest to A. canina, but the long very narrow interrupted panicle is constant in all the specimens from five distant localities at different elevations.

Var. ? palea 0, grain linear-oblong. A. nervosa, Nees, var. aristata, Munro in

Herb. Kew.—Sikkim; at Lachoong, alt 9000 ft.

8. A. Hookeriana, Clarke mes. (non Munro); very slender, leaves very narrow flaccid, ligule oblong, paniele broad with rather distant whorls of few very long flexuous capillary branches naked and unbranched for half their length, spikelets \(\frac{1}{10} - \frac{1}{8} \) in., gl. I and II unequal lanceolate acuminate, III about \(\frac{1}{4} \) shorter tip truncate denticulate, callus glabrous or minutely hairy, awn dorsal.

SIRKIM HIMALAYA, alt. 9-11,000 ft., in meadows, J. D. H. Cummins (in Herb.

Clarke).

Stem 1-2 ft. Leaves 2-6 in., flat, $\frac{1}{13}$ in. broad. Panicle 2-6 in., branches 2-3 in., minutely scaberulous; pedicels as long as the spikelets or longer. Spikelets green, rather distant; awn exserted; callus sometimes distinctly but minutely bearded. Anthers linear. Grain oblong.—Spikelets very much larger than in the foregoing species. This is not A. Hookeriana, Munro ex Duthie Grass. N.W. Ind. 30, nor Lachnagrostis Hookeriana, Nees ex Steud. Syn. Gram. 192.

+ Gl. III not awned.

9. A. micrantha, Steud. Syn. Gram. 70; tall, rather slender, leaves narrow, ligule oblong, panicle elongate inclined contracted in fl., branches long capillary smooth spreading in fruit, spikelets \(\frac{1}{16} \) \(\frac{1}{18} \) in., gl. I and II unequal oblong-lanceolate acute, III \(\frac{1}{4} \) shorter tip truncate crenate callus

quite naked, nerves very faint, palea = about ½ gl., anthers about ½ gl.—A. Wightii, Munro in Herb. Hook. f. & T. in part).—Agrostis, Wall. Cat. n. 3776.

CENTRAL HIMALAYA, alt. 4-6000 ft., from Garwhal to Sikkim. PKHASIA HILLS, alt. 5000 ft., Clarke.

Stem 2-3 ft., tuited, rather stout below in Wallich's specimens. Leaves 3-6 in., by \(\frac{1}{10} \)-\frac{1}{3} in., rarely broader, scaberulous. Panicle 4-10 in., lax-fld., slightly scaberulous, branches naked till towards the tips, lower whorled or fascicled; top of pedicels clavate. Spikelets green, gl. III 5-nerved, nerves all very slender or evanescent, the median sometimes arrested half way. Grais linear-oblong.—Steudel describes the palea as long as the gl., but it never exceeds \(\frac{1}{2} \) of that organ. The Khasian specimens have a much reduced panicle and much smaller palea.

10. A. myriantha, Hook. f.; stems stout leafy, leaves broadly linear-lanceolate, ligule short, panicle 4-12 in. inclined contracted many-and dense-fid., rachis rather stout, branches fascicled or whorled often fig. to the base, spikelets $\frac{1}{10}$ — $\frac{1}{10}$ in., gl. I and II subequal oblong subacute, III nearly as long tip truncate crenate, nerves very faint, callus quite naked, palea = $\frac{1}{10}$ gl., anthers $\frac{1}{10}$ gl.—Agrostis, n. 7 Herb. Hook. f. & T.

SIRKIM HIMALAYA; alt. 9-12,000 ft., common. Khasia Hills, alt. 4-6000 ft., common.

Stem 1-5 ft., suberect or geniculate below. Leaves 4-12 by \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., scaberulous. Paricle 6-12 in., contracted in flower, less so in frt.; branches very many in many fascicles, strict, erect, sometimes naked for half their length. Spikelets pale green, or brownish shortly pedicelled; gl. I and II scaberulous on the keels; III 5-uerved, nerves anthers palea and grain as in A. micrantha.—Very near A. micrantha, but a nuch more leafy species, with shorter and broader gl. I and II, and III longer in proportion.

Var. sikkimensis; stem 1-2 ft., leaves 4-8 by 1-1 in., ligule oblong, anthers =

the gl.—Sikkim, common in woods.

Var. khasiana; stem 3-5 ft., sometimes as thick as a goose-quill below, leaves 6-12 by 1-1 in., ligule often 0, panicle up to 12 in., anthers = 1 the gl.—Khasia Hills, abundant.

11. **A. Clarket**, *Hook. f.*; very slender, leaves very narrow, ligule short, panicle broadly pyramidal, branches capillary spreading sparingly divided, spikelets $\frac{1}{12}$ $\frac{1}{10}$ in., gl. I and II very unequal narrowly lanceolate acuminate, III much shorter than II 5-nerved nerves slender, tip truncate crenate, callus quite glabrous, palea very minute or 0. A. canina, *Munro in Herb. Ind. Or. Hf. & T. (in part).*

WESTERN HIMALAYA; Herb. Royle; Sikkim, alt. 9-11,000 ft., J. D. H., Clarke, Cummiss.

Stem 6-14 in., suberect. Lowest leaves filiform, upper flat, all very narrow, scaberulous. Paniele 1½-7 in., brauches spreading in fl. and frt., smooth or nearly so, naked below, lower geminate or in whorls of 3-5. Spikelets narrow, green purplish or very dark purple; gl. I ½ or more longer than II, very finely acuminate, keel scabrid; III short and broad.—Regarded by Mr. Clarke as an awnless form of A. casina, but besides wanting the awn, gl. I and II are narrower and more acuminate, and III much shorter.

12. A. insequiglumis, Griseb. in Goett. Nachr. (1868) 80; stems 4-6 in. densely tufted stiff stout, leaves filiform or nearly so, ligule short, panicle spiciform dense-fid., branches very short, spikelets \(\frac{1}{14} \) \(\frac{1}{10} \) in., gl. I and II unequal ovate-lanceolate acute, III \(\frac{1}{2} \) shorter than II tip parrowly

truncate crenate, callus quite naked, palea minute or 0, anthers short. Agrostis n. 10, Herb. Ind. Or. Hook. f. & Thoms.

SIRKIM HIMALAYA; alt. 12-16,000 ft., J. D. II., Clarke, &c.

Stem 4-6, rarely 8 in. Leaves usually convolute, upper sometimes flat, not 1 in. broad; lower sheaths green or purple. Panicle 1-2 in., strict, branches stout densely imbricating, fig. to the base. Spikelets very shortly and stoutly pedicelled, green or dark purple.-A very common alpine grass, constant in habit at all elevations.

13. A. divaricata, Griseb. in Goett. Nachr. (1868) 82; stems 4-6 in. densely tufted capillary, leaves capillary, panicle small with widely spreading divaricate sparingly divided branches and capillary pedicels, spikelets $\frac{1}{18}$, in., gl I and II very unequal ovate-lanceolate, I acute, II acuminate, III about & shorter than II tip truncate crenulate, nerves very faint, callus quite glabrous, palea most minute orbicular, anthers short. Herb. Ind. Or. Hf. & T. No. 11.

SIKKIM HIMALAYA, Yeumtong, on moist banks, alt. 13,000 ft., J. D. H.

The most delicate little species known to me, resembling Aira caryophyllea in size and slenderness, but growing in dense tufts. Leaves about 1 in., convolute, flexuous; ligule short, oblong. Panicle about 1 in. long and broad, branches geminate, quite smooth. Spikelets remote, purple, keels of gl. I and II scabrid, pedicels rather long. Grain oblong .- A single specimen of a Sikkim Agrostis in Herb. Calcutta (n. 663 in part) without further habitat, resembles this in the small stature and panicle, but has a much stouter stem, and flat leaves about 10-18 in. gl. I and II are more obtuse. More specimens of both are much wanted.

DOUBTFUL SPECIES.

A. NERVOSA, Nees ex Trin. in Mem. Acad. Peter.b. Ser. VI. vi. II (1845) 328; Steud. Syn. Gram. 165; Duthie Grass. N.W. Ind. 30; leaves flat, ligule very short, panicle 4 in. lower branches 4-nate naked below, gl. I and II subequal hardly \(\frac{1}{3}\) in. acute, III \(\frac{1}{3}\) shorter, awn 0, palea rather shorter than the ovary, callus very shortly retrorsely pilose. —Nepal. (See Calamagrostis pilosula).

A. PROCERA, Retz. Obs. iv. 19. ? Thysanolona Agrostis.

A. WIGHTII, Nees ex Steud. l. c. 168; leaves flat margins scabrous, ligule ovate, panicle long capillary, branches 2-4-nate, branchlets 2-3-chotomous scabrid, gl. I and II equal subobtuse, keel scabrid III = II 3-denticulate, palea rather longer than the ovary ovate-lanceolate acute. Vilfa vulgaris, Wight Herb. 78 (ex Steud.).

A. Zenkeri, Steud. l. c. 170; stem exceedingly slender scaberulous above. leaves 1-12 in. erect strict convolute retrorsely scabrid, ligule obtuse, panicle pyramidal, rays 2-nate widely spreading, spikelets 11 line purple, gl. I and II equal acute, III as long shortly denticulate 5-nerved awn 0, palea as long 2-nerved, callus hairy all over .- Nilahiri Hills.

73. MUDHLEMBERGIA, Schreb.

Annual or perennial very slender grasses. Leaves narrow, flat. Spikelets very numerous and minute, 1-fld., panicled, terete, not jointed on their pedicels; rachilla jointed at the base, not produced. Glumes 3, I and II persistent, equal or unequal, 1-nerved; III as long or longer than I and II, terete, membranous, 3-nerved, hairy below the middle, tip

acute or minutely 2-toothed awned, awn very slender not twisted; palea oblong, as long as the gl. or longer, 2-nerved, nerves almost meeting in the tip; callus minute. Lodicules 2, very minute. Anthers short or long. Styles free, stigmas short. Grain cylindric, free in the gl. and palea.—Species about 60 chiefly temp. American.

The above character applies to the Indian species; of the American some have only one empty gl., in others gl. III is awnless or 5-nerved.

1. M. sylvatica, Torr. & Gr. ex Trin. in Mem. Acad. Petersb. Ser. VI. vi. II. (1845) 292 (excl. syn. viridissima); panicle erect contracted interrupted, branches very short fig. to the base, spikelets very shortly pedicelled, Bl. I and II $\frac{1}{12} - \frac{1}{10}$ in lanceolate acuminate, III about as long, awn $\frac{1}{3} - \frac{1}{3}$ in. Steud. Syn. Gram. 179; A. Gray Man. Bot. N. U. St. 612, t. 8; Duthie Grass. N.W. Ind. 28. M. Duthiæana, Hack. in Herb. Duthie. Agrostis diffusa, Muchlb. Descr. Gram. 64. A. sylvatica, Torrey Fl. N. Am. i. 87 (non Linn.).

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4-9000 ft., Royle, &c .-

DISTRIB. Japan, N. Am.

Stem 1-3 ft., very slender, branched, decumbent and creeping below. Leaves 3-5 by $\frac{1}{10-6}$ in., smooth or scaberulous; ligule very short, lacerate. Panicle 4-6 in., pale green or violet; rachis and very short erect branches and pedicels scabrid. Spikelets crowded, erect; gls. I and II subequal, 1-3-nerved, keels scabrid; III minutely notched at the tip, hairs much shorter than the gl.; palea about as long as its gl.

2. M. viridissima, Nees ex Steud. Syn. Gram. 178; panicle elongate much fastigiately branched flexuous interrupted branches and pedicels slender, gls. I and II $\frac{1}{20}$ in. equal or unequal, III twice as long or longer, awn $\frac{1}{3}$ —1 in. Duthie Grass. N. W. Ind. 28. M. Huegelii, Trin. in Mem. Acad. Petersb. Ser. VI. vi. II. (1845) 293. M. geniculata, Nees ex Steud. Syn. Gram. 178; Duthie l. c.—Podosaemum, Wall. Cat. n. 3778.

TEMPERATE HIMALAYA, alt. 3-9000 ft., from Kashmir to Sikkim and the Khasia Hills.

Habit of *M. sylvatica*, but usually a larger grass, with longer broader leaves and a loose interrupted flexuous bright green panicle often a foot long. *Spikelets* shortly pedicelled; gls. I and II very variable, both ovate-lanceolate 1-nerved and shortly awned with scabrid keels and awn, or I much smaller oblong or orbicular erose and nerveless.

3. M. himalayensis, Hack. in Herb. Duthie n. 10,128; panicle elongate much fastigiately branched interrupted, branches and pedicels slender, gls. I and II $\frac{1}{8}-\frac{1}{8}$ in. subequal lanceolate acuminate or subaristate, III as long as I and II or rather longer, awn $\frac{1}{2}-1$ in.

WESTERN HIMALAYA, alt. 6-7000 ft., from Chamba to Simla, Thomson, Madden, &c.

Stem 12-18 in., very slender, decumbent or ascending, branched. Leaves narrow, flaccid; ligule oblong. Panicle 8-6 in., very narrow, slender, flexuous, flaccid, branches distant. Spikelets bright green, glistening, larger than in sylvatics and viridissima to which latter it is most nearly allied, differing in being more slender with narrower leaves, in the laxer, fewer fid. panicle, in the larger spikelets, and in gl. III not being much longer than I and II.

74. CALAMAGROSTIS, Adans.

Stout or slender grasses. Leaves narrow. Spikelets in narrow or effuse panicles, 1-fld., not jointed on the pedicels; rachilla jointed at the base, not produced beyond gl. III. Glumes 3, I and II equal or unequal, lanceolate, acuminate, glabrous or scaberulous; III shorter, hyaline, truncate, crenate or cleft, glabrous or hairy, awned, paleate; palea often minute, rarely 0; callus bearded with long or short hairs.—Species about 15? natives of cold and temp. climates.

See remarks under Agrostia (p. 253). See also Deyeuzia abnormis, which is intermediate between that genus and Calamagrostis.

- · Glume III glabrous.
- † Hairs of callus longer than gl. III.
- § Glume III dorsally awned at the middle or below it.
- 1. C. epigejos, Roth. Tent. Fl. Germ. i. 34; stem stout creeping below, leaves glaucous scaberulous, ligule long acute, panicle dense, branches scaberulous, spikelets \(\frac{1}{2} \) \displies in, gl. I and II subequal subulatelanceolate, III = \(\frac{1}{2} \) II tip 2-fid, awn dorsal at or near the middle, palea = \(\frac{1}{2} \) gl. III, hairs of callus as long as gls. I and II. Kunth Enum. Pl. i. 237, Suppl. 184; Host Gram. Austr. iv. 24, t. 42. Reichb. Ic. Fl. Germ. t. 43; Ledeb. Fl. Ross. iv. 432; Boiss. Fl. Orient. v. 525; Duthie Grass. N. W. Ind. 30. C. georgica & thyrsoides, C. Koch in Linnæa, xxi. (1848) 387, 388. C. glomerata, Boiss. et Bühse in Mem. Soc. Nat. Mosc. xii. (1860) 229. C. lithuanica & vilneensis. Schult. Mant. iii. 602. C. lanceolata, Stokes in With. Arr. Brit. Pl. Ed. III. ii. 122. C. glauca & Huebneriana, Reichb. Fl. Germ. Excurs. 27, Ic. Fl. Germ. t. 43. C. rigens, Fries Summ. Veg. Scand. 240. Arundo epigejos, Linn. Sp. Pl. 81; Engl. Bot. t. 402; Fl. Dan t. 2165; Knapp Gram. Britt. t. 97.

KASHMIB, alt. 8-14,000 ft., Falconer, &c.-DISTRIB. N. Asia. Europe. S. Africa.

Stem 2-4 ft., erect, usually stout. Leaves long, narrow, finely acuminate, scaberulous, more or less glaucous; ligule oblong, rather long, acute. Panicle 6-12 in. or more, oblong or lanceolate, much branched, branches usually erect. Spikelets shortly pedicelled, erect, green or light or dark purple; gl. I and II subequal or II the longest, 1-nerved or II 3-nerved, keel and often margins scaberulous; III glabrous, smooth or scaberulous, awn equalling its gl.

2. **C.** decora, Hook. f.; stems tall tufted very slender, leaves very long flat, panicle loosely branched, spikelets $\frac{1}{6}$ in., gls. I and II subequal lanceolate, scaberulous, III = $\frac{3}{4}$ — $\frac{3}{4}$ I truncate 4-cuspidate, awn subbasal exserted, palea as long as the gl., callus hairs rather longer than gl. III.

KASHMIR; Astor Valley, alt. 9-10,000 ft., Duthie (n. 12,660).

Stem 4-5 ft. or more. Leaves 12-18 by 1 in., scaberulous, pale green; sheath smooth; ligule large, oblong, rounded. Panicle 3-8 in., pale green, rachis slender and fascicled branches scaberulous, branches naked below. Spikelets shortly pedicelled, suberect; gls. I and II hardly membranous, finely acuminate, keels scaberulous, I 3-nerved; III glabrous, except the callus; awn shortly exserted. Anthers linear.

- §§ Glume III awned in the upper third or tip.
- 3. C. emodensis, Griseb. in Goett. Nachr. (1868) 80; stem stout creeping below, leaves long broad flat glaucous scaberulous, panicle dense or effuse much-branched, spikelets $\frac{1}{4}$ in. crowded, gl. I and II unequal subulate-lanceolate, III = $\frac{1}{4}$ I cleft to about the upper $\frac{1}{4}$ awned in the cleft, awn exserted, palea = $\frac{3}{4}$ its gl. C. nepalensis, Herb. Strach. & Winterb. (in part). Calamagnostis, Wall. Cat. n. 3781 B.

TEMPERATE HIMALAYA, alt. 7-12,000 ft., from Kashmir to Bhotan, Fulcoser, &c.

- Stem 3-5 ft., as thick as a goose-quill below. Leaves 12-18 by \(\frac{1}{2} \) \(\frac{1}{3} \) in., thinly coriaceous, pale glaucous green, many-nerved; sheath nearly smooth or scaberulous; ligule blong, membranous. Paniele 6-10 in., inclined or nodding, very soft, shining and silky, pale grey; branches branchlets and very short pedicels capillary, smooth, or minutely scaberulous. Glumes I and II very thin, smooth, keels scaberulous, I 1-nerved; II 3-nerved; III glabrous, hyaline, usually cleft from the upper third into two lanceolate subulate-acuminate lobes; but the lobes are sometimes irregularly lacerate at the tip; nerves 5, faint.
- 4. C. littorea, DC. Fl. Franc. v. 255; stem stout or slender creeping below, leaves narrow scaberulous often convolute, ligule oblong, panicle dense or effuse, spikelets \(\frac{1}{2} \) in., gl. I and II unequal subulate-lanceolate scaberulous, III = \(\frac{1}{3} \) \(\frac{1}{2} \) in truncate erose or toothed, awn terminal in a notch or short cleft or dorsal below the tip included, palea nearly as long as the gl. Kunth Enum. Pl. i. 237; Reichb. Ic. Fl. Germ. t. 42; Boiss. Fl. Orient. v. 524; Steud. Syn. Gram. 187. C. glauca, Reichb. Fl. Germ. Excurs. 27. C. lanceolata, Aitchis. in Journ. Linn. Soc. xviii. (1880) 107 (non Both.). C. laxa, Host Gram. Austr. iv. 25, t. 43; Ledeb. Fl. Ross. v. 432; Herb. Ind. Or. Hf. & T. (in part); Griseb. in Goett. Nachr. (1868) 80. C. nepalensis, Nees ex Steud. Syn. Gram. 193; Duthie Grass. N.W. Ind. 30; Aitchis. in Trans. Linn. Soc. Ser. II. Bot. iii. 124. Arundo glauca, M. Bieb. Fl. Taur. Cauc. i. 79. A. laxa, Roem. & Sch. Syst. ii. 502. A. littorea, Schrad. Fl. Germ. i. 212, t. 4, f. 2.—Calamagrostis, Wall. Cat. n. 3781 A.

TEMPERATE HIMALAYA, alt. 6-10,000 ft. from Kashmir to Sikkim. WESTERN TIBET, alt. 10-12,000 ft.—DISTRIB. Europe, N. and W. Asia.

Stem 2-5 ft., erect, as thick as a crow-quill or small goose-quill, but sometimes very slender. Leaves 12-18 by \(\frac{1}{45} \) in, firm, smooth or scaberulous, flat or convolute; sheaths smooth; ligule linear-oblong. Passicle very variable in form and composition, erect or inclined, green or purple, rachis and branches scaberulous. Spikelete rarely \(\frac{1}{4} \) in. long, sometimes only \(\frac{1}{4} \) in., when the outer glumes are broader; gl. I and II with scaberulous keels, I usually about \(\frac{1}{4} \) longer than II, but sometimes subequal, I 1-nerved and II 3-nerved at the base, but both sometimes 3-nerved; III glabrous, smooth or faintly scaberulous, faintly 5-nerved; awn very slender, variable in length, rarely longer than its gl.—A very difficult plant to define satisfactorily so much do the spikelets vary in size, in the breadth of the empty gls., and in the incision of the top of gl. III, which is either rounded and obsuely 2-toothed with an awn in the sinus, or truncate with a terminal awn, or 2-lobed nearly \(\frac{1}{2} \) way down with lobes irregularly incised and the awn in the sinus, or finally the awn may be strictly dorsal below the truncate tip. Dr. Stapf, who has revised the whole of the Indian material which I had referred to this species, confirms the above view of its variation, and agrees with me in referring it to the European C. littorca.

Var. tartarica; stem shorter stouter, leaves convolute, panicle strict narrowly

oblong dense-fid., spikelets usually dark purple. C. tartarica, Jacquem. mss. C. laxa, var. robustior, Herb. Hf. & T.—Common in the drier districts especially in Western Tibet.

5. **C. Stolizkai**, *Hook. f.*; stem short stout, leaves erect convolute, panicle short oblong contracted dense, spikelets $\frac{1}{5}$ in. shortly pedicelled, gl. I and II subequal lanceolate acuminate scaberulous, III about $\frac{1}{5}$ shorter than II tip truncate 4-aristulate, awn terminal exserted, palea as long as its gl., hairs of callus rather longer than gl. III shorter than I and II

WESTERN TIBET; Zanskar, on the Pensi-la, alt. 12-15,000 ft., Stolizka.

Stem 18-24 in., erect. Leaves 3-6 by 3-1 in., very scabrid above; sheaths scaberulous; ligule oblong. Panicle 4 in.; branches short, erect or suberect, scabrid. Spikelets erect, crowded, pale, shining; gl. I and II hyaline, sub 3-nerved; III glabrous, hairs of callus unequal in length; awn about twice as long as the spikelet, straight, shortly exserted.—I have seen only two specimens.

6. **C. debilis,** Hook. f.; very slender, leaves short very narrow, panicle narrow, branches few rather short laxly flowering and pedicels capillary, spikelets ξ in pale, gls. I and II unequal lanceolate acuminate keels quite smooth, III about $\frac{1}{3}$ shorter than II or less, tip truncate crose, awn dorsal in upper third of the gl. exserted, palea as long as its gl., hairs of callus = gl. I and II.

SIKKIM HIMALAYA; Chola, alt. 11,000 ft., J. D. H.

Stem 12-18 in., tufted, geniculate below. Leaves distant, 1-2 by \(\frac{1}{8} - \frac{1}{12} \) in., flat, quite smooth, upper shorter spreading; sheath smooth; ligule oblong. Panicle 2-5 in., branches and branchlest smooth. Spikelets pale purplish brown, long-pedicelled; gl. I and II 1-nerved; llI glabrous, 5-nerved. Anthers very small.—I found this very delicate species only once and then late in the season, the very small anthers are peculiar.

++ Hairs of callus much shorter than gl. III.

7. **C. tripilifera**, Hook. f.; very slender, leaves short narrow flat, panicle of few very long wide spreading 2-3-nate branches sparingly divided towards the ends, spikelets \(\frac{1}{2} \) in. long-pedicelled, gls. I and II subequal lanceolate acuminate, III firm \(\frac{1}{2} \) shorter than I tip truncate with 2 short lateral awns and a median dorsal exserted awn, palea \(\frac{1}{2} \) shorter than its gl., hairs of callus very unequal.

SIRKIM HIMALAYA; in the drier interior, alt. 10-13,000 ft. J. D. H., Clarke,

King's Collector.

Stem tufted, 8-18 in., erect, hardly thicker than pack-thread. Leaves 4-6 by \(\frac{1}{10-\frac{1}{8}} \) in., rather flaccid, quite smooth; sheaths smooth; ligule oblong. Panicle with few whorls of few quite smooth capillary branches 1-2 in. long each bearing 3-5 glistening pale yellow on dull purplish spikelets on pedicels longer than themselves; gls. I and II 1-nerved, quite smooth, even the keels; III glabrous, rather strongly 4-nerved, tip with mucros between the lateral and middle awns, the latter of which is stiff and nearly twice as long as its gl.; callus hairs nearly half as long as gl. III.

Var. Cumminsii; panicle contracted, branches much stouter appressed to the rachis, spikelets 16-15 in.—N.E. Sikkim, Cummins.—Perhaps a different species, but the stems, about a span long, being curved in a semicircle, show that the plant

has grown under unfavourable conditions.

- ** Glume III hairy all over; callus hairs shorter than gl. III.
- † Palea of gl. III nearly as long as its gl.
- 8. C. Munroana, Boiss. Fl. Orient. v. 523; very slender, leaves long narrow, panicle effuse or contracted, spikelets $\frac{1}{16} \frac{1}{10}$ in., gls. I and II subequal oblong-lanceolate acute 1-nerved, keels nearly smooth, III = \frac{3}{4} I broadly truncate crenate, awn short infra-median included or 0, callus shortly hairy, anthers short. Agrostis ciliata, Herb. Strackey & Winterbottom; Herb. Ind. Or. Hf. & T. in part; PDuthie Grass. N.W. Ind. 29 (non Nees). A. Munroana, Aitch. & Hemsl. in Journ. Linn. Soc. xix. (1882) 192. A. pilosula, Hack. in Herb. Duthie n. 6231 (non Trin.). A. Royleana, Duthie l. c. 30.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 8-12,000 ft., Royle, &c. -- DISTBIB. Affghan.

Stems 6-18 in., tufted, roots fibrous. Leaves 2-8 in., scaberulous or nearly smooth, flaccid, or in high altitudes strict; sheaths nearly smooth; ligule variable. Panicle 2-5 in., oblong or pyramidal; branches capillary, erect or spreading, lower fascicled or 2-3-nate, smooth or minutely scaberulous, lower often long spreading and naked below. Spikelets pedicelled, green or purplish; gl. I and II very thin, smooth; III hairy all over; palea as long as its gl. or ‡ shorter.—A very variable plant, one of two (the other is C. pilosula) which have been referred by Munro and others to Agrostis Royleana, Trin., a plant described by Trinius as having the bearded rachilla proper to Deyeusia (see end of genus). I have in vain sought to identify Munroana with any other of the Roylean species, none of which are accurately described.

Var. stricta; stem 6-10 in. strict, leaves very narrow rather stiff erect, panicie contracted, branches short erect or spreading, pedicels very short, spikelets green or purple, gl. III always awned. Agrostis No. 4, Herb. Strack. & Winterb.—Common at slittudes of 11-15,000 ft. Though differing entirely in habit from the lax open panicled form of Munroana, I feel sure that this is only the alpine form of that plant from intermediates occurring between them. It resembles Agrostis inaquiglumis, Griseb.

9. G. Griffithiana, Hook. f.; tall, erect, leaves long narrow subcoriaceous, panicle long narrow branches subcrect, spikelets & in., gl. I and II subequal lanceolate acute, III narrow tip truncate with 4 short bristles the lateral longest, awn subbasal to median exserted, hairs of callus very short, anthers linear. C. Hookeriana, var. aspera, Munro in Herb. Hf. & T. Agrostis Royleana, Munro in Herb. Strach. & Winterb. n. 2. Lachnagrostis Griffithiana, Munro Cat. Pl. Griff. Falc. &c. 67 ined. Deyenxia Griffithii, Munro l. c. 56.

WESTERN HIMALAYA; Kumaon, alt. 5500 ft., Struckey & Winterb. KHASIA

HILLS, alt. 5000 ft., Griffith (Kew distrib. n. 6598), Hf. & T. &c.

Stem 2-3 ft., quite erect, as thick as a crow-quill. Leaves 6-10 by \(\frac{1}{8}-\frac{1}{6}\) in., and sheaths smooth or subscaberulous; ligule very short. Panicle erect; branches 2-4 in., 2-5-nate, naked for half their length, then with crowded branchlets and shortly pedicelled green or purplish spikelets. Spikelets \(\frac{1}{2}\) in., III hairy all over; palea nearly as long as its gl.—A much taller and stouter plant than any form of C. Munroana, with much larger spikelets, short callus hairs, and linear anthers. A fourth imperfect gl. sometimes occurs.

- tt Palea of gl. III very short, rarely = 1 its gl.
- 10. C. pilosula, Hook. f.; stem very slender erect, leaves long

narrow flat, panicle effuse or contracted, branches long or short suberect or spreading, spikelets $\frac{1}{10} - \frac{1}{8}$ in., gl. I and II subequal oblong-lanceolate acute or acuminate 1-nerved smooth, III oblong tip truncate erose or crenate with sometimes 4 minute setulae, awn subbasal exserted, hairs of callus $= \frac{1}{3}$ gl. III or shorter, anthers linear. Agrostis pilosula, Trin. in Mem. Acad. Petersb. Ser. VI. vi. II. (1845) 372.

TEMPERATE and ALPINE HIMALAYA, alt. 6-14,000 ft., from Kashmir to Sikkim. NILGHIRI HILLS, alt. 3-6000 ft., Wight, Schmid, Jacquemont, &c. CEYLON, alt.

6-8000, Walker, &c.

Stems 1-3 ft. or more, tufted, 6-10 in, in alpine specimens, erect from a short inclined base. Leaves variable in breadth, up to 1 in., but usually very narrow, flaccid, smooth or subscaberulous; sheath smooth; ligule very variable, longest in the upper leaves. Panicle very variable, large and effuse with spreading branches 1-4 in. long naked below and with loosely crowded spikelets at the extremities, or contracted with suberect shorter branches, or short broadly ovate or triangular; branches branchlets and pedicels minutely scabrid. Spikelets membranous, green and glistening in the larger forms, purple in others and more herbaceous in the alpine; gl. I and II smooth or subscaberulous, I rather the shortest, keels near or quite smooth, rarely scabrous; III 1-1 shorter than I, hyaline, hairy all over, nerves often indistinct; palea usually very minute, rarely nearly half as long as its gl.; awn more or less exserted .- A very variable grass of which Wallich's No. 3775 A from Nepal, with spikelets in long may be regarded as the type; his B has rather larger spikelets, but is not otherwise different. I am far from supposing that I have succeeded in unravelling its synonymy which is inextricably confused with C. Munroana Agrostis alba and others. The following are marked forms in their typical states as defined, but they pass into one another.

Var. Wallichiana; very slender, leaves narrow sometimes filiform smooth, panicle 2-3 in., branches spreading lax-fid., spikelets green or purple. Agrostis ciliata, 3, Nees in Herb. Royle. A. Hookeriana, Munro in Herb. Kew (non Steud.). A. Neesii, Steud. l. c. 293. A. nervosa, var. aristata, Munro in Herb. Hook. f. & T. & Herb. Falconer. A. Royleana, Duthie Grass. N.W. Ind. 30 (non Trin.). A. Wallichiana, Steud. Syn. Gram. 174. Lachnagrostis ciliata, Munro in Herb. Jacquem. n. 215. L. Hookeriana, Munro mss. Arundinella Hookeriana, W. & A. ex Arn. in Herb. Kew (Ceylon).—Agrostis Wall. Cat. n. 3775.—Agrostis n. 5, Herb. Strachey

& Winterb .- A common form.

Var. scabra; stem 2-4 ft. stout, leaves 6-12 by \(\frac{1}{4}\)-\frac{1}{2} in., panicle very large effuse with long spreading horizontal capillary branches sometimes 4-5 in. long in distant whorls or fascicles, spikelets \(\frac{1}{18}\)-\frac{1}{2} in. pale green, gl. III with the truncate tip sometimes minutely 2-4-mucronulate. Agrostis bicuspidata, Hack. in Herb. Duthie n. 10,088. A. Royleana, Hack. l. c. n. 7583. Lachnagrostis scabra, Nees in Herb.

Royle.—In woods at about 7-10,000 ft. from Kashmir to Sikkim.

Var. alpestrie; stem 6-18 in. strict, leaves narrow strict, panicle shorter narrow or broad, spikelets smaller $\frac{1}{12} - \frac{1}{10}$ in. dark purple rarely green, gls. I and II oblong-lanceolate, palea sometimes = $\frac{1}{2}$ its gl. Agrostis nervosa, Nees in Herb. Royle; ?Trin. in Mem. Acad. Peters. Ser. VI. vi. II. (1845) 328. A. Royleans, Nees l. c. (non Trin.). A. ciliata, \(\beta\). nervosa, Nees in Herb. Royle. A. Roylei, Trin. en Hack. in Herb. Duthie n. 6229.—Kashmir to Sikkim, alt. 11-15,000 ft.—A common grass at high elevations.

Var. ciliata; panicle narrow effuse, rachis flexuous, spikelets } in. shortly pedicelled pale shining, palea = † its gl. Calamagrostis ciliata, Steud. Syn. Gram. 193. Agrostis ciliata, Trin. l. c. 373. Lachnagrostis ciliata, Nees es Steud. l. c.—N.W. India, Royle. An obscure plant of which I have seen a single specimen

from Herb. Royle.

11. C. Schmidii, Hook. f.; stem very slender erect, radical leaves tufted on a woody branched rootstock linear-lanecolate rigid narrowed into

a slender petiole, cauline filiform convolute, panicle short broad, branches few and long pedicels capillary, spikelets few \(\frac{1}{6}\)-\(\frac{1}{6}\) in., gl. I and II unequal lanceolate, III truncate bicuspidate from the outer pair of nerves, awn subbasal exserted, callus hairs short, anthers linear.

NILGHIRI HILLS ; Ootacamund, Schmid.

Rootstock as thick as a crow-quill. Stem filiform. Radical leaves 2-3 in, glabrous, nerves strong; petiole very slender stiff; sheaths of old basal leaves clothing the base of the new, lacerate, about an inch long; ligule long, linear, membranous. Panicle broad, rachis and few distant branches quite smooth. Spikelets pale purplish, gl. I and II membranous, 1-nerved, keels scaberulous; III hyaline, 5-nerved, hairy, awn twice as long as the spikelet; palea very minute, suborbicular.

- L have seen only one poor specimen of this curious species, which should at once be recognized by its rootstock, and the slender rigid petioles of the leaves, long ligule, and tufted lacerate old leaf-sheaths about an inch long, crowning the rootstock. There is, however, in Herb. Kew a specimen of what may be the same species collected by Clarke at Conoor (in the Nilghiris) alt. 7000 ft., with a very slender stem 2-3 ft. long, and narrow flat sessile cauline leaves with a short ligule; its spikelets quite accord with those of C. Schmidti, but the base of the stem and lower leaves are wanting.
- 12. **C. Jacquemontii**, *Hook. f.*; tall, slender, leaves very narrow, ligule oblong, panicle narrow drooping, branches erect naked below, spikelets few $\frac{1}{2}-\frac{1}{4}$ in. long-pedicelled erect, gl. I and II subequal lanceolate sub 3-nerved, III = about $\frac{1}{2}$ II tip truncate 4-toothed, awn supra-basal exserted, palea minute, callus hairs = $\frac{1}{2}$ gl. III, anthers long.

KASHMIR; moist places on the Pyr Panjal, Jacquemont (n. 97).

Stems apparently tufted, 18 in. high, geniculate below. Léaves 5-6 by 1 in., scaberulous; sheaths quite smooth; ligule oblong. Panicle 4-5 in., lower branches fascicled, 1-11 in., scaberulous. Spikelets pale yellowish; keels of gl. I and II smooth, III hairy all over.—I have seen only two specimens. The long spikelets distinguish it. This approaches var. ciliata of C. pilosula, but the spikelets are considerably larger.

DOUBTFUL SPECIES.

C. HOOKERIANA, Steud. Syn. Gram. 292. Lachnagrostis Hookeriana, Nees en Steud. A Ceylon plant described as having the palea as long as its gl. which occurs

in no Ceylon specimen of the genus known to me.

C. ROYLEANA, Stoud. Nom. Ed. II. i. 251. C. Roylei, Steud. Syn. Gram. 193. Agrostis Royleana, Trin. in Act. Acad. Petersb. Ser. VI. vi. Sc. Nat. II. (1845) 371. Lachnagrostis Royleana, Nees in Herb. Royle ex Steud. Nom. l. c. L. Hookeri, Nees ew Steud. Syn. l. c.—Trinius founded this species on three plants, an Indian of Royle, a Nilghiri of Zenker, and a Ceylon one from "Herb. Whytt." One of his characters is the presence of a "bearded rudiment," which refers the plant to Deyeuxia. I know of no Deyeuxia in Ceylon or the Nilghiris

75. **DEYEUXIA**, Clar.

Characters of Calamagrostis, but with the rachilla of the spikelet produced beyond gl. III and usually penicillate with silky hairs; gl. III glabrous; hairs of callus usually short.—Species enumerated about 120.

See remarks under Agrostis (p. 253). In D. Treutleri the produced portion of the rachilla is most minute and naked, in D. abnormis it is awnless and the rachilla

is very minute or absent, but the hairs of the callus are more or less crowded at the base of the palea.

- A. Rachilla bearded or penicillate.
- * Awn of glume III basal or subbasal.
- 1. D. sylvatica, Kunth Revis. Gram. i. 77, Enum. Pl. i. 243, Suppl. 188, t. xiv. f. 5; tall, leaves long scabrid beneath, panicle contracted at length open, spikelets & in., gl. I and II subequal ovate-lanceolate, III rather shorter than I tip shortly lacerate, callus loosely bearded, awn about twice as long as its gl., palea rather shorter than its gl., rachilla shortly bearded. Calamagrostis sylvatica, DC. Fl. Fr. v. 253; Host Gram. Austr. iv. 28, t. 48; Trin. Gram. Unifl. 223, t. 4; Reichb. Ic. Fl. Germ. t. 38; Ledeb. Fl. Ross. iv. 427; Boiss. Fl. Orient. v. 526. C. arundinacea, Roth. Tent. Fl. Germ. i. 33. C. pyramidalis, Host l. c. 28, t. 49; Reichb. l. c. Arundo sylvatica, Schrad. Fl. Germ. i. 218, t. 4, f. 7. Agrostis arundinacea, Linn. Pl. Sp. 61.

WESTERN HIMALAYA; Kunawur, alt. 8000 ft., Thomson; Kashmir, alt. 10-11,000

ft., Duthie .- DISTRIB. Europe, Reg. Caucas.

Stem 3-5 ft., from a creeping base. Leaves linear, 1-2 ft. by \(\frac{1}{2}\)-\frac{1}{2} in., finely acuminate; ligule short. Panicle erect or drooping; branches short, scabrid. Spikelets green or purplish; gl. I 1-nerved; II 3-nerved; awn of III shortly exserted.—I have seen only two Indian specimens, which I think belong to D. sylvatica, Kunth, one from Thomson, with a very large panicle 16 in. long has the callus hairs scanty, about \(\frac{1}{2}\) the length of the gl., the other from Duthie has a shorter panicle, a much shorter rachilla, and the callus hairs are more copious and twice as long. I do not venture upon further citations than are given above, the synonymy of both Deyeuxia and Calamagrostis being in great confusion.

2. **D. elatior,** Hook. f.; very tall, stout, leaves long, panicle 1-2 ft. pyramidal branches long spreading, spikelets in., gl. I and II subequal lanceolate acuminate, III rather shorter than II tip truncate erose, callus laxly bearded, palea rather shorter than its gl., awn exserted, rachilla very short its hairs about half the length of the gl. or longer. Calamagnostis scabrescens, var. elatior, Griseb. in Goett. Nachr. (1868) 79.—Deyeuxia, No. 7, Herb. Ind. Or. Hf. & T.

KHASIA HILLS, alt. 5-5500 ft., Griffith, &c.

Stem 5-6 ft., as thick as a swan's quill below. Leaves 2-3 ft. by \$-\frac{3}{2}\$ in., coriaceous, closely nerved, midrib prominent beneath, glabrous or hairy beneath; sheaths hirsute or glabrescent; ligule short, scarious. Panicle 4-8 in. broad when expanded; branches scabrid, lower fascicled. Spikelets subscaberulous; gl. I and II thin, keels and upper margin of II scabrid; III membranous, callus hairs sometimes — the gl.; awn subbasal, twice as long as its gl. Grain linear-oblong.—Grisebath in reducing this to a variety of D. scabrescens, has overlooked the great difference in size and habit, and the different position of the awn which is subbasal.

3. **D. triaristata**, Hook. f.; very slender, leaves narrow, panicle flexuous contracted, rachis and branches capillary, spikelets $\frac{1}{4}$ in few, gl. I and II subequal narrowly lanceolate, III $\frac{1}{4}$ shorter than I truncate, two lateral nerves produced into long awns, two intermediate mucros, median awn exserted, palea $= \frac{1}{4}$ its gl., hairs of callus $= \frac{1}{4}$ gl. III.

SIKKIM HIMALAYA; in woods, Yeumtong, alt. 12,000 ft., J. D. H.

Stem 12-18 in., geniculately ascending from a slender creeping base, weak.

Leaves 6-8 in., narrowly linear, finely acuminate, smooth, flaccid; ligule short.

Panicle 5-6 in.; branches few, lower 2-3 in. long, and pedicels smooth. Spikelets

pale green, shining; gl. I and II quite smooth on the sides and keels; 'III hyaline, lateral awns more than half as long as the gl., dorsal awn inserted \(\frac{1}{2}\) above the base capillary, about twice the length of the gl.; rachilla short; callus hairs scanty short.

4. D. compacta, Munro ex Duthie Grass. N.W. Ind. 30 (name only); stem short, leaves very narrow, panicle open or spiciform, spikelets in., gl. I and II subequal oblong-lanceolate apiculate, III truncate tip erose, palea nearly as long as its gl., awn basal, hairs of callus short. PCalamagrostis holciformis, Jaub. & Spach. Ill. Pl. Orient. iii. 61, t. 340.

WESTERN TIBET, Jacquemont; Nubra valley, alt. 14-16,000 ft., Thomson; N.

of Kumaon, alt. 15,000 ft., Strackey & Winterb. (Deyeuxia, No. 1).

Stems 6-18 in., densely tufted, rather stout, sometimes slender. Leaves 1-3 in., flat or convolute; ligule short. Panicle 1-2 in., branches very short, scaberulous. Spikelets purplish; gl. I and II membranous, nearly smooth; III 1-1 shorter than II, minutely scaberulous, strongly 4-nerved, callus hairs short lax.—In Jacquemont's and all other specimens in Herb. Kew, the panicle is oblong spiciform, with very short branches, and not as represented in the figure cited of Calamagrastis holciformis which is taken from a specimen collected by Jacquemont and in which the panicle is quite open. The glumes I and II are represented in the same plate as narrowly lanceolate tapering to a point, and scabrid, none of which characters agree with these specimens. Lastly, the date of collection is given as 1830, and that of the Kew specimen 1831. Nevertheless having regard to the great variability of these alpine grasses, I am disposed to think both referable to one species.

5. **D. nivicola**, *Hook: f.*; stem short, leaves obtuse or acute, panicle contracted spiciform, branches very short, spikelets ½ in. very narrow, gls. I and II unequal lanceolate smooth, III truncate tip 4-mucronate, palea nearly = the gl., awn included? rachilla half as long as the gl. shortly plumose, callus shortly bearded. Deyeuxia n. 4, *Herb. Ind. Or. Hf. & T.*

SIRKIM HIMALAYA; Momay, alt. 15,000 ft., J. D. H.

Stem 5-7 in., densely tufted, erect or ascending, stout. Leaves as long as the stem or shorter, flat or subconvolute, 10-1 in. broad; ligule short, truncate. Panicle 1-1; in., strict, erect, green and purplish. Spikelets erect, appressed; gl. I about a longer than II, both 1-nerved, acuminate; III about half as long as I, hardly scabernlous, nerves 4, strong; awn basal, not twice as long as the gl., erect.

- ** Awn of gl. III inserted above the middle of the glume (awn 0 in D. abnormis and rachilla very minute or obsolete).
- 6. **D. scabrescens**, Munro ex Duthie in Atkins. Gaz. N.W. Ind. 628; tall, stout, leaves long, panicle long contracted, spikelets \(\frac{1}{2} \) in, glumes all scaberulous, I and II subequal 1-nerved, III tip narrowed obtuse truncate crenulate or 2-fid, awn submedian, palea linear, callus shortly bearded. Duthie Grass. N.W. Ind. 31; Clarke in Journ. Linn. Soc. xxv. (1889) 89, t. 39. Calamagrostis scabrescens, Griseb. in Goett. Nachr. (1868) 79.

TEMPERATE HIMALAYA, alt. 10-13,000 ft., from Kashmir to Bhotan. MUNNE-

PORE, alt. 9900 ft., Clarke.

Stem 2-5 ft. Leaves 6-18 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., flat or convolute, scaberulous; sheath smooth; ligale membranous, lacerate. Panicle 6-10 in., erect or inclined, densefid., branches scaberulous; pedicels long or short. Spikelets green or purplish; gl. I and II linear-lanceolate, acuminate, margins smooth or villously ciliate; III scarious, tip usually 2-fid, awn inserted rather above the middle about twice as long as the gl., slightly bent, rachilla = \(\frac{1}{2}\)-\(\frac{1}{2}\) gl. III, sparingly or copiously bearded.

Grain narrowly oblong.—I do not find the awn to be twisted, as in the description cited, and it is inserted lower than in the figure in the Linnsean Journal.

Var. humilis, Grisch. l. c.; smaller, stems weaker, leaves $\frac{1}{10} - \frac{1}{6}$ in. broad, panicle small lax-fld., spikelets green, gl. III hardly scaberulous, palea shorter. Deyeuxia No. 2, *Herb. Ind. Or. Hf. & T.*—Sikkim Himalaya; Lachen Valley, alt. 11-12,000 ft., J. D. H.

7. **D.** filiformis, Hook. f.; stem very slender, leaves short, panicle short, spikelets $\frac{1}{6}$ in., gl. I and II subequal subscaberulous, II 3-nerved, III hyaliue asperulous, tip truncate 4-cleft, awn capillary submedian exserted palea = $\frac{1}{2}$ - $\frac{1}{4}$ its gl., hairs of rachilla about = the gl., hairs of callus short. Calamagrostis filiformis, Griseb. in Goett. Nachr. (1868) 70.

SIKKIM HIMALAYA; Lachen Valley, alt. 10-12,000 ft., J. D. H.

Stem 12-18 in., terete, tufted. Leaves 2-4 in., narrow, nearly smooth; ligule membranous. Panicle 2-3 in. long and nearly as broad, pyramidal; branches few, very slender, nearly smooth. Spikelets shortly pedicelled, pale purplish; gl. I and II sometimes both 3-nerved; III strongly 4-nerved, irregularly 4-cleft at the apex, the lobes almost setaceous; awn inserted a little above the middle of the back.

8. **D. pulchella**, Hook. f.; stem short stout, panicle 1-2 in. oblong or ovate, spikelets in. crowded dark purple, gl. I and II scaberulous finely acuminate, III scaberulous irregularly 4-toothed or sub 4-aristate, awn supra-median to sub-apical included, pales i-1 as long as its gl., rachilla densely penicillate hairs = gl. III, callus shortly bearded. Calamagrostis pulchella, Griseb. in Goett. Nachr. (1868) 78.

ALPINE and SUBALPINE HIMALAYA; from Kumaon and Garwhal, alt. 10-15,000

ft., to Sikkim, alt. 14-16,000 ft.-DISTRIB. Tibet. W. Szechuen, Pratt.

Stems densely tufted, strict, erect. Leaves 3-5 in., rarely more, $\frac{1}{10}$ in. broad, smooth or scaberulous, usually flat; ligule short, membranous. Panicle variable in size and form; branches minutely scabrid, sometimes elongate and spreading. Spikelets smaller than in D. scabrescens and not so strongly scaberulous, I and II rather unequal; III split at the tip into almost setiform lobes; insertion of awn most variable, but never quite terminal, capillary, as long as its gl. or shorter.—A very variable plant; the N.W. specimens have large looser more open panicles than the Sikkim. In one specimen from Garwhal, alt. 10-13,000 ft. (No. 143 and 245 Duthie) the panicle is very open) and I find occasionally a gl. terminating the rachilla.

9. **D. abnormis**, Hook. f.; tall, leaves narrow flat, panicle broad or narrow, branches in distant whorls of 3-6 divided and flg. toward the ends, spikelets $\frac{1}{12}$ in long-pedicelled, gls. I and II subequal oblong-lanceolate acute, III rather shorter than I tip narrowly truncate crenulate, awn 0, palea = about $\frac{1}{2}$ its gl., rachilla very minute or obsolete, callus hairs = $\frac{1}{4}$ the gl. Agrostis abnormis, Munro Cat. Pl. Griff. Helfer, &c., 57, ined. Calamagrostis capillacea, Clarke mss.—Agrostis No. 11 & 12, Herb. Ind. Or. Hf. & T.

SIRKIM HIMALAYA; Lachoong Valley, alt. 9000 ft., J. D. H. KHASIA HILLS,

alt. 5-5500 ft., common, Griffith, &c.

Stem 6-18 in., densely tuited, erect strict and slender with a narrow panicle, or rambling with stout branching stems 3-4 ft. long and a very effuse panicle; upper internodes sometimes scaberulous. Leaves 6-8 by 1-1 in., rather rigid, scaberulous, as are the sheaths; ligule short, rounded. Panicle 4-6 in., rachis very slender strict; branches and branchlets capillary, quite smooth. Spikelets pale brown; gl.

- I and II 1-nerved; III glabrous, nerves faint; hairs of callus longest under the palea.—Resembles Agrostis alba, from which the long callus hairs at once distinguish it.
 - B. Rachilla minute, glabrous; callus hairs very short.
- 10. D. Treutleri, Stapf in Hook. Ic. Plant. t. 2396; tall, slender, panicle elongate lax-fid., spikelets $\frac{1}{12} \frac{1}{10}$ in., gl. I and II very unequal lanceolate subacute scaberulous, III longer than II coriaceous obtuse scaberulous, palea as long as the gl., rachilla very small styliform, callus minutely hairy. Milium Treutleri, O. Kuntze Rev. Gen. Plant. 780 (partim).

SIKKIM HIMALAYA, alt. 7-12,000 ft., in woods, J. D. H., Treutler, Clarke.

Stem 2-4 ft., leafy nearly to the top. Leaves 8-10 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., linear-lanceolate, acuminate, flaccid, scaberulous beneath; ligule oblong. Panicle ovate, flaccid, at length rigid, scaberulous; branches in distant whorls. Spikelets narrowly ovoid, pale; gl. I ovate-lanceolate, acute, 1-nerved; II longer, subacute, 1-nerved; III longer than II, laterally compressed, keeled; palea about as long as the gl. Grain oblong, laterally compressed, tightly wrapped in the gl. and palea.—A very anomalous species.

Tribe VII. AVENEZ. (See p. 6.)

76. ERIACHNE, Br.

Rigid, densely tufted grasses. Leaves filiform, convolute. Spikelets few, 2-fld. (both fl. perfect), not jointed on their long pedicels; rachilla jointed at the base, not produced beyond gl. IV. Glumes 4, I and II empty, subequal, persistent, keeled, many-nerved; III and IV subequal, narrow, at length rigid, awned or not; palea rigidly coriaceous, 2-cuspidate or 2-aristate, nerves obscure. Lodicules 2, oblong, truncate. Stamens 2-3. Styles free, stigmas plumose. Grain free within the rigid gl. and palea.— Species about 22 Australian, and 2 Asiatic.

1. E. triseta, Nees ex Steud. Syn. Gram. 237; gl. I and II linear-lanceolate, III and IV long-awned. palea long-awned. Trim. Cat. Ceyl. Pl. 108; Steud. Syn. Gram. 237. Megalachne zeylanica, Thwaites Enum. Pl. Zeyl. 372, 414.

TENASSERIM; Mergui, Griffith, Helfer. CEYLON; Colombo, Thwaites.

Stems 1½-2 ft., slender, erect, branched below. Leaves 3-nerved; ligule very short, ciliate. Panicle 2-4 in. Spikelets with the awns ½-2 in. long, purple; gl. I and II subaristate, glabrous; III and IV narrow, silky; callus long.

2. **E. pallescens**, Br. Prodr. 184; gl. I and II ovate acuminate, III, IV. and palea biouspidate. Kunth Enum. Pl. i. 310; Steud. Syn. Gram. 237. Benth. Fl. Austral. vii. 630. E. chinensis, Hance in Ann. Sc. Nat. Ser. IV. xv. (1861) 228, in Journ. Linn. Soc. xiii. (1873) 136. E. Hookeri, Munro in Journ. Linn. Soc. vi. (1862) 42, name. Aira effusa, Spreng, Syst. i. 278.

CHITTAGONG, J. D. H. & T. T. PAHANG, Ridley. NICOBAR ISLDS., Rurz .-

DISTRIB. Borneo, Tonkin, China, Australia.

Stem 1-2 ft. Leaves glabrons or slightly hairy. Panicle very lax. Spikelets with the awns ½ in.; gl. I and II slightly hairy; III and IV narrow and palea villously hirsute, awns of III and IV about — the gl., of palea very short.—Bentham describes the palea as entire, but in the Indian specimens they terminate in two short rigid spines.

77. ZENKERIA, Trin.

Tall, perennial, long-leaved grasses. Spikelets small, panicled, 2-fld. (both fl. perfect), not jointed on their pedicels; rachilla jointed at the hairy base, not produced beyond gl. IV. Glumes 4, I and II empty, subequal or unequal, 1-nerved, keeled, acute, persistent; III and IV equal, obtuse or acuminate, many-nerved; palea as long as its gl., broad, keels strongly ciliate or hirsute. Lodicules 2, ovate, denticulate. Stamens 3. Styles short, distinct. Grain unknown.—Species the following.

1. Z. elegans, Trin. in Linnea, xi. (1837) 150, t. 3; leaves long narrow, panicle thyrniform, branches erect, gl. I and II unequal, III and IV acuminate much longer than II. Trim. Cat. Ceyl. Pl. 108. Amphidonax Heynii, Nees in Wight Cat. n. 1747; Steud. Syn. Gram. 97; Thwaites Enum. Pl. Zeyl. 370. A. tenella, Wight & Arn. ex Steud. l.c.—Pappophorum? Wall. Cat. n. 8903.

SOUTHERN DECOAN PENINSULA, Heyne, &c. BURMA, Kurs. CEYLON, Thwaites,

- Stem 2-3 ft., as thick as a crow-quill, rigid, base woody. Leaves as long as the stem or longer, striot, coriaceous, convolute, rarely flat, glabrous or sparsely hairy; sheaths coriaceous; ligule rounded. Panicle 6-8 in.; rachis flexuous; branches filiform, smooth. Spikelets to in., pedicelled, white; gl. I and II ovate, hyaline, 1-nerved; I shortest, midrib very strong, excurrent; III and IV lanceolate, sparsely villous, 7-9-nerved; IV longest and most acuminate; callus bearded with long straight hairs; palea as broad as the gls., hirsute. Anthers long, narrow.
- 2. Z. obtusifiora, Benth. in Journ. Linn. Soc. xix. (1881) 93; leaves broadly linear-lanceolate narrowed at both ends, paniele pyramidal, branches widely spreading, gl. I and II unequal or subequal, III and IV obtuse not longer than II. Trim. Cat. Ceyl. Pl. 108. Amphidonax obtusifiora, Thwaites Enum. Pl. Zeyl. 370.

CEYLON; at Ratnapoora, Thwaites.

Stems 8-5 ft., glabrous. Leaves 2 ft. by $\frac{1}{2}$ -1 in., acuminate, pungent, glabrous, coriaceous; ligule very short, densely hairy. Panicle 6-8 in.; branches capillary, solitary or 2-nate; pedicels longer than the spikelets, with a glandular callus at the base. Spikelets $\frac{1}{13}$ - $\frac{1}{10}$ in., as broad as long; gl. I and II ovate, apiculate by the strong excurrent nerve, glabrous; III and IV rather longer, sides and callus villous; palea as in Z. elegans.

78. COELACHNE, Br.

A small leafy very variable marsh grass. Leaves short, flat or convolute. Spikelets 2-fld. (both fl. perfect or upper imperfect) in open or contracted or spiciform panicles, not jointed on the pedicels, not awned; rachilla jointed at the base, produced between gl. III and IV but not beyond IV. Glumes I and II broad, concave, obtuse, persistent, empty, I the largest; III much longer, subsessile, coriaceous, glabrous, except the shortly bearded callus; palea as long, coriaceous; IV much smaller and palea more or less hairy. Lodicules Of Stamens 3; anthers long, narrow. Ovary ovoid. stigmas free. Grain free within the gl. and palea.

G. pulchella, Br. Prodr. 187.

NEPAL, Wallich, KHASIA and MUNNEPORE HILLS, alt. 4-6000 ft., BURMA, CENTRAL and SOUTHERN INDIA, and CEYLON.—DISTRIB. Trop. Asia, Australia, and Madagascar.

Stem 6-18 in., flaccid, decumbent or ascending, slender or rather stout, leafy up to the panicle. Leaves uniform throughout the stem, \(\frac{1}{2} - \) in., lanceolate, subulate, acuminate, distant or subequitantly sheathing, ecostate, minutely scaberulous above, nerves striate; ligule a few hairs. Panicle very various. Spitelets \(\frac{1}{10} - \) \(\frac{1}{10} - \) in., sessile or pedicelled, globose or ovoid; gl. I and II suborbicular or hemispheric, many-nerved, membranous or herbaceous; III hermaphrodite, coriaceous, dorsally rounded, nerves 0 or very obscure; palea coriaceous, margins incurved; IV much the smallest, often imperfect, neuter or fem.—After a long study of a multitude of specimens from all the countries mentioned above, I conclude that there is but one known species of this genus. If there are two, the second is one to include vars. gracillima and perpusilla, in which case the latter name would be very inappropriate for both.

Var. pulchella proper; stems filiform decumbent and ascending, leaves lanceolate flat, panicle with distant spreading filiform branches, spikelets $\frac{1}{20} - \frac{1}{18}$ in. subglobose, gl. I and II hemispheric, III broadly ovoid, IV faintly hairy or glabrous. C. pulchella, Br. l. c.; Endl. Iconogr. t. 2; Kunth Revis. Gram. ii. t. 143, Enum. Pl. i. 371; Steud. Syn. Gram. 284; Benth. Fl. Austral. vi. 626. Gramin, Wall. Cat. n. 8909.—Burma; source of the Chappedong River, Wallich. Australia.

Var. brachiata, Munro in Herb. Kew; stem stout or slender subcrect or ascending, panicle 2-4 in. long, branches shorter than in pulchella proper, spikelets 10-15 in. like those of pulchella proper but sessile. C. brachiata, Munro ex Benth. Fl. Austral.

vii. 626 (partim).—Tenasserim, Griffith (Kew Distrib. 6875) Helfer.

Var. simpliciuscula; stem suberect or creeping and rooting rather stout, leaves flat, panicle elongate narrow, branches short stiff, spikelets $\frac{1}{15}$ in. ovoid sessile crowded on the branches or in fascicles on the main rachis, gl. I and II unequal, III ovate-lauceolate. C. simpliciuscula, Munro cx Benth. in Journ. Lins. Soc. xix. (1881) 93, Fl. Austral. vii. 626. C. infirma, Buese Pl. Jungh. i. 350; Mig. Fl. Ind. Bat. iii. 399. C. pulchella, Thw. Enum. 273; Benth. Fl. Hongk. 430. C. brachiata, Trim. Cat. Ceyl. Pl. 108. C. madagascariensis, Baker, in Journ. Linn. Soc. xxv. (1890) 348. Isacline brachyglumis, Hochet. in Hohen. Pl. Nilgh. n. 1283 (name). Panicum simpliciusculum, Wight & Arn. ex Steud. Syn. Gram. 96.—Khasia and Naga Hills, alt. 4-5000 ft. J. D. H. & T. T., Clarke. Nilghiri Hills, Wight, &c. Ceylon, Walker, Thwaites (CP. 884).—Java, Tonkin, China, Madagascar.—Intermediate between brachiata and spicata.

Var. spicata; stem short stout suberect, leaves flat, spikelets $\frac{1}{10}$ $\frac{1}{10}$ in. ovoid in dense spiciform panicles subsessile, gl. I and II orbicular subequal membranous, III broadly ovate.—Nepal, Wallich (Cat. n. 8908). Chota Nagpore, Clarke. S. India,

Wight (Herb. n. 3376).-China.

Var. gracillima, stems 6-12 in. capillary or filiform, leaves flat, panicle very slender, branches short spreading, spikelets few $\frac{1}{13} - \frac{1}{10}$ in. pedicelled, gl. I and II very unequal, III and IV lanceolate. C. perpusilla, Thw. Enum. 373 (in part).— Nilghiri Hills, Schmid. Ceylon, Adam's Peak and Newera Elia, in swamps, Thwattes (C.P. 130).

Var. perpusilla, stems capillary densely tufted leaves filiform, panicles as in gracillima but with fewer branches and spikelets. C. perpusilla, Thw. l.c. in part (C.P. 450). Trim.l.c. (in part). Isachne perpusilla, Wight & Arn. ex Wight Cat.

n. 2043. - Ceylon, Walker, Adam's Peak, Thwaites.

Var. Gardneri; stem 12-18 in. stout flexuous, clothed threaghout with subulate-lanceolate erect sheathing leaves, panicle stiff with few short spreading branches, spikelets $\frac{1}{15}$ in. sessile, gl. I and II subequal, III ovate.—Ceylon, Gardner (n. 1018, 1019).

79. TRISTACHYA, Nees.

Perennial grasses. Leaves various. Spikelets 2-fld. (lower fl. male upper fem. or perfect), panicled, not jointed on their pedicels; rachilla villous, produced between gl. II and III but not beyond IV, jointed at the base. Glumes 4; I and II unequal, not awned, persistent, empty, lanceolate,

acuminate, glabrous; III lanceolate, acuminate, membranous, awn 0; IV deeply 2-fid with a long twisted awn in the sinus (copiously bearded above the middle in the Indian sp.); palea narrow, acute. Lodicules minute, cuneate, fleshy. Anthers long. Styles long, slender. Grain narrow, free.—Species 8, chiefly tropical.

T. barbata, Nees ex Steud. Syn. Gram. 238; Boiss. Fl. Orient. v. 552; Duthie Grass. N.W. Ind. 32. T. Stocksii, Boiss. l.c.; Munro in Aitchis. Cat. Panjab. Pl. 168; Duthie Fodd. Grass. N. Ind. 51. Loudetia barbata, A. Braun in Flora, xxiv. (1841) ii. 714. Sorghum barbatum, Hochst. et Steud. Pl. Arab. Exsicc. n. 788.

SCIND; Stocks .- DISTRIB. Arabia, Nubia.

Stem 6-18 in. branched and woody below, geniculately ascending, base clothed with tomentose sheaths, slender and wiry above; nodes bearded. Leaves 1-3 in., lanceolate from a rounded base, finely acuminate, pungent, rigid, glaucous, manynerved, margin thickened subserrulate; sheaths smooth; ligule 0. Panicle sparingly branched, 1-2 in. long and broad; brunches solitary and 2-nate, capillary, flexuous, subscaberulous, branchlets 1-3-fld. Spikelets \(\frac{1}{2} \) in., pale yellowish; gl. I and II 3-nerved, II \(\frac{1}{2} - \frac{1}{2} \) longer than I; III much longer than I, interruptedly 7-nerved, and its callus glabrous; IV with a very short broad lamina, margins involute, lateral lobes lanceolate, aristate, 3-nerved, rather longer than the hairs; median awn about twice as long as the gl.—I find no character for T. Stocksii.

80. AIRA, Linn.

Annual or perennial grasses. Leaves narrow. Spikelets 2-fld. (both fl. perfect) panicled, branches capillary; rachilla jointed at the base, not produced beyond gl. IV. Glumes 4, hyaline; I and II subequal, 3-nerved, acute, empty, persistent; III and IV smaller, often 2-toothed; awn dorsal, capillary, usually twisted below; callus naked; palea hyaline, 2-nerved. Lodicules 2. Anthers small. Grain minute, free or adhering to the hyaline gl.—Species 4 or 5, Europe and temp. Asia.

A. caryophyllea, Linn. Sp. Pl. 66; annual, very slender, leaves setaceous, ligule lanceolate, panicle broad erect capillary trichotomously branched, spikelets long-pedicelled. Kunth Enum. Pl. i. 289, Suppl. 241, t. 18, f. 2; Fl. Dan. t. 382; Lamk. Encycl. t. 44; Host Gram. Austr. ii. 33, t. 44; Svensk. Bot. t. 508; Reichb. Ic. Fl. Germ. t. 94; Engl. Bot. t. 812; Knapp Gram. Britt. t. 35; T. Nees Gen. Fl. Germ. Monocot. i. n. 44; Steud. Syn. Gram. 221; Ledeb. Fl. Ross. iv. 424; Boiss. Fl. Orient. v. 529; Duthie Grass. N.W. Ind. 31. A. canescens, Host l.c. iv. 21, t. 36. A. Cupaniana, Guss Fl. Sic. Syn. i. 145. A. curta, patulipes & plesiantha, Jord. ex Bor. Fl. Centr. Fr. Ed. III. ii. 701. A. divaricata, Pourr. in Mem. Acad. Toul. iii. (1788) 307. A. multiculmis, (multicaulis, Kunth), Dumort. Agrost. Tent. 121, t. 7, f. 28. A. purpureo-argentea, Gilib. Exercit. ii. 526. A. rigida, Dulac Fl. Haute-Pyren. 82. A. Todari, Tenore ex Tod. Ind. Sem. Hort. Panorm. 1859; Linnæa, xxx. (1859) 784. A. triaristata, Clarke Trav. ii. 452. Avena caryophyllea, Weber in Wigg. Prim. Fl. Hols. 10. Fussia caryophylla, Schur Enum. Pl. Transs. 754.

N.W. HIMALAYA; Kashmir, Vicary, Stewart, Kohat, and Lahul, Hay, &c. WESTERN TIBET, alt. 12,000 ft., Stoliska.—DISTRIB. N. Africa, temp. Asia (introd. elsewhere).

Stems 2-10 in., tusted, filiform, scabrid above. Leaves obtuse and sheaths

scabrid, ligule long. Panicle 1-2 in. long and broad. Spikelets $\frac{1}{12}$ $\frac{1}{12}$ in., ovoid, shining, gl. I and II ovate, exceeding II and III, keels scabrid; tips of fig. gls. 2-setose; awn twice as long as the gls., bent.

81. DESCHAMPSIA, Beauv.

Perennial grasses. Leaves flat or convolute. Spikelets 2- (rarely 3-) fld. (both fl. perfect) panicled, not jointed on their padicels; rachilla jointed at the base, produced beyond gl. IV as a naked or penicillate stipes rarely bearing a male fl. Glumes 4; I and II empty, subequal, or II largest, persistent, keeled, acute, membranous, shining; III and IV subhyaline, tip toothed or lobed; awn dorsal, slender, straight or twisted; pales narrow, 2-nerved. Lodicules ovate, fleshy. Stamens 3. Styles distinct. Grain oblong, free within the gl.—Species about 20, of temp. regions.

1. D. cospitosa, Beauv. Agrost. 91, t. 18, f. 3; stem short or tall, panicle effuse or contracted, spikelets variable in size, gl. I and II ovatelanceolate acute subequal or II rather longer, IV hardly exceeding II, awn about equalling the gl., straight not twisted. Kunth Enum. Pl. i. 286, Suppl. 241; Ledeb. Fl. Ross. iv. 421; T. Nees Gen. Fl. Germ. Monocot. i. n. 43; Boiss. Fl. Orient. v. 531: Benth. Fl. Austral. vii. 587; Hook. f. Fl. Nov. Zel. i. 301; Duthie Grass. N.W. Ind. 31. Aira cospitosa, Linn. Sp. Pl. 64; Fl. Dan. ii. t. 240; Engl. Bot. t. 1453; Knapp Gram. Britt. t. 33; Trin. Sp. Gram. Ic. t. 253, 256; Reichb. Ic. Fl. Germ. t. 96. A. Kingii, Hook. f. Fl. Antarct. 376, t. 135. A. major, Syme Engl. Bot. Ed. III. xi. 63. A. micans, Jacquem. mss. Triodia splendida, Steud. Syn. Gram. 249.—Deschampsia, Wall. Cat. n. 3802; Gramin. Wall. l. c. n. 8911.

TEMPERATE and ALPINE HIMALAYA and WESTERN TIBET, in swamps from Kashmir to Bhotan, alt. 10-16,500 ft.—DISTRIB. N. and S. temp. and cold regions.

Stem 6 in. to nearly 3 feet high, stout or slender, smooth, shining, leafy upwards or in small states at the base chiefly. Leaves short or long, flat, rather softly coriaceous, quite smooth; sheaths smooth, upper very long; ligule obtuse. Panicle 4-8 in., short dense-fld. and erect, or lax-fld. effuse and inclined, sparingly branched; branches and pedicels capillary, smooth or minutely sparsely scaberulous. Spikelets 1-1 in., white and silvery or fulvous purplish; rachilla slender, hairy; gl. I and II concave, subscute, nerveless, or II which is broadest sub-3-nerved; III and IV truncate, erose, crenate or irregularly toothed, callus silkily hairy; awn dorsal, sub-basal.—I have not attempted to give all the synonymy of this almost cosmopolitan (in temperate regions) and very variable plant which, I think, includes fully a dozen supposed species of the N. temperate and Arctic zones. Wallich's n. 8911 "Aira coerulea, Hb. Madr." was long a puzzle to me. It is accompanied with the ticket "Aira coerulea, Bla ta tel," which latter word Dr. Stapf recognized as the Swedish for Molinia coerulea. No doubt the specimen, which is of Deschampsia cospitosa, is a Swedish one, and was introduced by accident into the Madras Herbarium.

Var. colorata, Griseb. Spicil. Fl. Rumel. ii. 457; stem short strict 4-6 in, leaves short basal, panicle small broadly ovate dense-fld., pedicels and branchlets very short, spikelets dark bronsy-yellow, sometimes 3-fld., Boiss. l. c. D. Biebersteinianus, Sch. f. Mant. ii. 380. D. brevifolia, Br. in Parry Voy. App. 191. Aira brevifolia, Bieb. Fl. Taur. Cauc. iii. 63. A. triflora, Trin. is Flora, i. (1886) 433. A. Wilhelmsii, Steud. Sym. Gram. 219.—Western Tibet; Balch Pass, alt. 16,500 ft., Strach. & Winterb. Sikkim, alt. 14-16,000 ft., J. D. H.

2. D. kcelerioides, Regel in Bull. Soc. Nat. Mosc. xli. (1868) 299; stem short, leaves basal linear erect, panicle short ovoid or subspiciform,

spikelets very shortly pedicelled imbricating brownish-yellow, gls. III and IV broad more or less 2-lobed lobes irregularly toothed.

KASHMIR and BALTISTAN, DRAS, and ISKARDO, alt. 10-14,500 ft., Clarke

Duthie .- DISTRIB. Turkestan.

Stem 6-18 in., leafy below, rather stout, strict, erect. Leaves 2-5 by $\frac{1}{10}$ in., linear, acute, flat, nearly smooth; ligule oblong. Panicle 1-1\frac{1}{2} in., erect. Spikelets $\frac{1}{6-\frac{1}{2}}$ in.; gl. I shorter than II, sometimes 2-lobed nearly \frac{1}{2} way down with erose lobes, at others hardly lobed but unequally rather deeply toothed.—Perhaps only a form of D. caspitosa, the flg. glumes of which vary much in breadth and toothing. Regel describes the leaves of kaleriodes as narrow setaceous and scabrid above, which is totally at variance with his specimens, which are even broader than those of the Indian plant.

81*. HOLCUS, Linn.

Annual or perennial tomentose grasses. Leaves usually flat. Spikelets panicled, laterally compressed, oblong, 2-fld. (both fl. bisexual, or upper male or neuter), not jointed on their pedicels; rachilla articulate at the base produced into a short stipes beyond gl. IV. Glumes 4; I and II empty, persistent, obtuse or acute, keeled, I 1-nerved; II 3-nerved; III and IV shorter than I and II, membranous; III not awned, at length hardened; IV with a slender dorsal awn; palea narrow, 2-keeled. Lodicules 2, cuneiform. Stamens 3. Styles very short, distinct. Grain oblong, free within the hardened gl.—Species about 8, European and African.

H. LANATUS, Linn. Sp. Pl. 1047; perennial, softly tomentose, panicle spreading pale green, spikelets $\frac{1}{6}$ in., awn of gl. IV hardly exserted. Fl. Dan. t. 1181; Host Gram. Austr. i. p. 275, t. 2; Engl. Bot. t. 1169; Knapp Gram. Britt. t. 17; Kunth Enum. Pl. i. 34, Suppl. 24, t. 9, f. 2; Ledeb. Fl. Ross. iv. 410; Reichb. Ic. Fl. Germ. t. 105; Boss. Fl. Orient, v. 532.

SIRKIM HIMALAYA; Darjeeling, alt. 7000 ft., Clarke, apparently naturalized .-

DISTRIB. Europe, temp. Asia.

Stems 1-3 ft., densely tufted, roots fibrous, nodes villous. Leaves 6-10 in.; upper sheaths inflated; ligule short, oblong, Panicle 2-5 in., branches 2-3-nate. Spikelets pale green or reddish; gl. I and II acute or apiculate, strongly-nerved; II often retuse and mucroutlate; III smooth and shining in fruit.—H. mollis, l., an almost equally common European grass, may be expected to be introduced into the hills of India; it closely resembles H. lanatus, but has a creeping rootstock and the awn of gl. IV is longer and exserted.

82. AVENA, Linn.

(Including Trisetum, Beauv.)

Annual or perennial grasses. Leaves usually flat. Spikelets 2- or more-fld., in effuse contracted or spiciform panicles, not jointed on their pedicels; rachilla jointed at the base and sometimes between the flg. glumes. Glumes dorsally rounded, I and II empty, subequal or unequal, thin, persistent, few- or many-nerved; fl. gls. ovate or lanceolate, entire 2-toothed or -cleft, lobes awned or not, 3-7-nerved, lateral nerves sometimes obsolete; awn dorsal below the cleft, usually long and geniculate or cflexed with a twisted base, rarely straight; palea narrow, keels scabrid or ciliate. Lodicules usually 2-fid. Ovary glabrous or top villous; styles short, free. Grain various, free or (in some sp. with villous top) adherent to the palea.—Species many, chiefly N. temperate.

Having regard to the Indian species of Avena and Trisetum, I find it impossible to separate them by characters of the fi. gls., there being all transitions in A. aspera from the entire gl. of Avena to the 2-aristate lateral lobes of Trisetum. There are two distinct types of overy in both genera, the perfectly glabrous, and that with a broad hirsute or villous crown, characters which may suggest a better means of breaking up Avena. The following arrangement is provisional only. It is difficult to diagnose Avena from Bromus & Koeleria (q.v.).

- Sect. I. EUAVENA. Annual. Spikelets pendulous; gl. I and II 5-7-nerved, lobes of fl. gls. awned or not; awn cylindric, column 2-grooved, concidally twisted. Ovary with a villous top.—The determinations of the species of this section are by Dr. Stapf.
- *.Flowering glumes glabrous or hairy at the base only, rachilla tenacious or tardily disarticulating at the base.

A. SATIVA, Linn. Sp. Pl. 79.

Cult. in NORTHERN INDIA, from Bengal to the Indus; and in the HIMALAYA up to 12,000 ft.

There are few specimens of the common oat in Indian collections. These represent two varieties.

Var. sericea; branches of panicle spreading equally all round, spikelets 2-fld., both fl. perfect, gls. III and IV silkily hairy at the base, rachilla silkily villous.—Bhotan, Griffith. Sikkim Himalaya, cult. at Yeumtong, alt. 12,000 ft., J. D. H. Beluchistan and Affghanistan; wild in cult. fields in the Kurrum Vulley, Aitchison (n. 24).

Var. orientalis; branches of panicle more or less secund, spikelets 2-3-fld. the lower only perfect, gl. III with stiff hairs at the base, IV and rachilla glabrous. A. orientalis, Schreb. Spicil. Fl. Lips. 52; Host Gram. Austr. iii. 31, t. 44; Kunth Enum. Pl. i. 302, Suppl. 255; Boiss. Fl. Orient. v. 541. A. sterilis, Royle Illustr. Himal. Bot. 417.—N.W. India, Royle. Soane Valley, J. D. H. Murshidabad, Clarke.

- ** Flowering glumes hairy to and beyond the middle; rachilla freely disarticulating at the base, more tardily above it; gl. III and IV firm, shortly 2-fid., scaberulous.
- 1. A. fatua, Linn. Sp. Pl. 80; paniele branches equally spreading all round, gls. I and II subequal 9-nerved, III and IV firm scaberulous shortly 2-fid. clothed below with long fulvous hairs. Host Gram. Austr. ii. 42, t. 58; Fl. Dan. t. 1629; Engl. Bot. t. 2221; Knapp Gram. Britt. t. 93; Kunth Enum Pl. i. 302, Suppl. 256; Reichb. Ic. Fl. Germ. t. 103; Steud. Syn. Gram. 230; Ledeb. Fl. Ross. iv. 412; Boiss. Fl. Orient. v. 543; Royle Ill. Himal. Bot. 416; Duthie Grass. N.W. Ind. 31, Fodd. Grass. N. Ind. 51. A. byzantina, C. Koch in Linnea, xxi. (1848) 392. A. sterilis, Del. ex Boiss. l. c.; Duthie l. c. 32 (non Linn.)? A. pilosa, M.B. Griseb. in Goett. Nachr. (1868) 78.

The PANJAB, N.W. HIMALAYA, and WESTERN TIBET, in cult. fields, ascending to 9000 ft. Sikkim Himalaya, alt. 9000 ft., Gammie.—Distrib. Temp. Europe, N. Africa, and N. Asia.

Stem 1-3 ft., stout, nodes hairy. Leaves flat, scaberulous; sheaths smooth; ligule short, torn. Panicle 6-10 in.; branches and pedicels scabrid. Spikelets about 1 in.; rachilla hairy. Callus of gl. III short, obtuse, setulose; awn stout, longer than the gls.

2. A. barbata, Brot. Fl. Lucitan. i. 108; softly tomentose, panicle

subsecund, spikelets 2-fld., gls. I and II 9-nerved, III and IV thin not scaberulous 2-fld with awned lobes densely hirsute below the middle. Lodeb. Fl. Ross. iv. 413; Boiss. Fl. Orient. v. 543; Grissb. in Gostt. Nachr. (1868) 78. A. athenanthera, Presl Gram. & Cyp. Sic. 30. A. hirsuta, Roth. Catalect. Bot. iii. 19; Kunth Enum. Pl. i. 302; Webb. Phyt. Canar. iii. 400, t. 247; Steud. Syn. Gram. 230; Royle Ill. Himal. Pl. 417. A. hirtula, Lag. Gen. & Sp. Nov. 50; Kunth l. c. & Suppl. 256.

WESTERN HIMALAYA; Kumaon, Thomson.—Distrib. Mediterranean region, W.

and N. Asia.

Habit of A. fatua, from which its hairy leaves, &c. distinguish it.—These Avenaceous weeds of cultivation have not been much collected in India, where the above and others no doubt abound.

Sect. II. Annual, dwarf. Spikelets erect, gl. I 1-nerved, II 3-nerved, top of fl. gl. 2-aristate. Ovary glabrous, narrow.

3. A. Cavanillesii, Koch Syn. Fl. Germ. Ed. I. i. 797; leaves flat or convolute, panicle spiciform, spikelets 2-fld. A. Loefflingiana, Cav. Ic. i. t. 45, f. 1; Gaud. Agrost. Helvet. i. 327; Balb. Misc. Bot. i. 12 (non Linn.). A. valesiaca, Nym. Syll. Fl. Europ. 414. Trisetum Cavanillesii, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 63 (excl. Syn. Cav.); Kunth Enum. Pl. i. 297; Steud. Syn. Gram. 225. T. Gaudinianum, Boiss. Voy. Esp. 653, Fl. Orient. v. 535; Parlat. Fl. Ital. i. 259. T. Loefflingianum, Beauv. ex Duthie Grass. N.W. Ind. 31. T. valesiacum, Boiss. ex Nym. Conspect. 814.

BRITISH BRLUCHISTAN; at Killa Abdulla, Duthie. PRSHAWUR, Stewart (ex

Duthis) .- DISTRIB. Westward to Spain.

Stems 4-6 in., densely tufted. Leaves \(\frac{1}{2}\)-1 in., linear, obtuse, sparsely hairy, rather thick; ligule oblong, hyaline. Panicle 1-2 in., oblong; branches and pedicels very short, smooth. Spikelets \(\frac{1}{2}\) in., shining, green with purplish awns, 2-fld, and with a third imperfect; rachilla densely villous, hairs longer than the gl.; gl. I and II very unequal, keels smooth; I lanceolate; II oblong, acute; III much shorter than II, lanceolate, hyaline above and 2-nerved, the nerves ending in lateral awns as long as the gl.; callus bearded; dorsal awn nearly twice as long as the gl.; palea narrowly linear, nerveless.

Sect. III. Perennial. Spikelets erect. Fl. gls. 5-9-nerved. Ovary hirante.

4. A. pratensis, Linn. Sp. Pl. 80; panicle contracted, spikelets 5-7-fld., gl. I and II 3-nerved, flg. gls. entire rounded notched or erose at the tip. Fl. Dan. t. 1083; Host Fl. Austr. ii. 38, t. 51; Engl. Bot. t. 1204; Knapp Gram. Britt. t. 91; Reichb. Ic. Fl. Germ. i. t. 99; Kunth Enum. Pl. i. 300, Suppl. 254; Steud. Syn. Gram. 231; Ledeb. Fl. Ross. iv. 414; Boiss. Fl. Orient. v. 546; Duthie Grass. N.W. Ind. 31. A. alpina, Sm. in Trans. Linn. Soc. x. (1811) 335; Kunth l. c. 301; Griseb. in Goett. Nachr. (1868) 78. A. argæa, Boiss. l. c. A. bromoides, Mert. & Koch in Roehl. Fl. Deutschl. Ed. III. i. 570. A. secunda, Jacquem. mss. (non Salisb.). Heuffelia præusta & pratensis, Schur Enum. Pl. Transs. 780. H. australis, Fourn. in Ann. Soc. Linn. Lyon, N.S. xvii. (1869) 183.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 9-15,000 ft.--DISTRIB.

Europe, Asia Minor.

Stems 10-18 in., densely tufted, rather stout, strict, leafy below. Leaves 6-10 by \(\frac{1}{2}\) in., erect, coriaceous, scaberulous above, margins thickened; sheath nearly smooth; ligule oblong, lacerate. Passicle 8-4 in., erect or inclined; branches short, erect, and pedicels scaberulous. Spikelets \(\frac{1}{2}\)-\(\frac{1}{2}\) in., narrow, glistening, green or

coppery-brown; rachilla penicillate; gl. I and II scarious, nerves scaberulous; I linear-oblong; II oblong-lanceolate; fl. gls. oblong, scarious above the middle, strongly 7-9-nerved, tip and margins broadly hyaline, margins and nerves scaberulous; awn median-dorsal, twice as long as the gl., bent just above the top of the gl.; keels of palea smooth. - Hackel (in litt.) refers the Kashmir plant to A. argaea, Boiss., which the latter author distinguishes from A. pratensis by the short leaves, very short branches of the short few-fld, panicle, and golden-brown spikelets, characters all of which may be traced in Kashmir and European A. pratensis.

5. A. aspera, Munro ex Thw. Enum. Pl. Zeyl. 372; tall, slender, panicle elongate contracted flexuous inclined or nodding, branches suberect naked below, spikelets 3-4-fid. scattered, gl. I and II very unequal scarious, I 1-3-nerved, II 5-nerved, fl. gls. coriaceous smooth or scabrid 5-7- (rarely 3-) nerved tip entire crose 2-fid or 2-aristate, keels of palea closely pectinately ciliate. Trimen Cat. Ceyl. Pl. 109; Griseb. in Goett. Nachr. (1868) 78.

SIKKIM HIMALAYA, alt. 9-10,000 ft., J. D. H., Clarke. KHASIA HILLS, alt. 5-6000 ft., Griffith, &c. Nilghibi Hills, Schmid, Maswell. Cevion, alt. 6000 ft., Thwaites.

Stem 2-5 ft., slender or rather stout, erect or inclined, glabrous, or nodes slightly pubescent. Leaves 6-12 in. or more, flat or convolute, rarely 1 in. diam.; sheaths smooth, glabrous or pubescent; ligule short, truncate, membranous. Paniels 8-16 in., usually nodding, rachis and branches smooth or faintly scabrid; lower branches longer, oblong-lanceolate, rather shorter than III; fl. gls. ovate-lanceolate, glabrous, from entire to 2-dentate or cleft nearly | way down; callus bearded; awn dorsal rather above the middle but below the cleft of the gl., and twice to thrice its length, slender, column twisted then bent and more or less recurved; keels of palea with long close-set fine cilia. Lodicules narrow, cleft. Anthers linear. Ovary obovoid or pyriform, top densely hirsute.-A very variable plant. Some of the Khasian specimens have stems 5 ft. high, and as thick as a goose-quill below, others are much smaller and very slender. The fl. gl. are most scabrid in Ceylon and Peninsular specimens, least so in Sikkim ones which pass into var. Roylei. The nearest European species is A. Besseri, Gmel. (A. sempervirens, Bess. non Vill.) of Hungary, a rigid species with narrower scabrid leaves, usually longer spikelets and obtuse erose fig. glumes.

A. ASPERA, PROPER; leaf sheaths smooth, panicle glabrous, fl. gl. more or less scaberulous entire 2-dentate or 2-fid., lobes not awned.—Sikkim, the Khasia and

Nilghiri Hills and Ceylon.

Var. Roylei, Hook. f.; leaf-sheaths glabrous or softly pubescent, panicle glabrous or puberulous, fl. gls. quite smooth tip entire 2-toothed or 2-fid almost to the awn into acuminate or long-awned lobes, or tip split into 3-4 short unequal bristles. A. aspera, Griseb. l. c. A. pubescens, Royle Ill. Himal. Pl. 417; Duthie l. c. 32. Trisetum virescens, Nees ex Steud. San. Gram. 226; Duthie Grass. N.W. Ind. 31 (non Regel).—Avena, Wall. Cat. n. 3793.—Kushmir to Nepal, alt. 6-12,000 ft. A very common grass, often 4-5 ft. high with leaves half an inch broad.

Var. parvifora, Hook. f.; sheaths villously pubescent, branches of panicle short. scabrid, spikelets crowded shortly pedicelled ‡ in. long, gl. II 3-nerved, fl. gls. 2-dentate smooth.—Sikkim, on Singalela, alt. 11,000 ft., Clarks.

Var. ? Schmidis, Hook. f.; stem slender, leaves chiefly radical, sheaths softly hairy, panicle very contracted, rachis short branches and very short pedicels puberulous or scaberulous, spikelets in. 2-3-fld., fig. gls. very scabrid 5-nerved tip 2-aristate, keels of palea shortly ciliate. - Nilghiri Hills, Sohmid; Ootacamund, alt. 7500-8000 ft., Clarks.—Possibly a distinct species. One specimen has 7-nerved fl. gls.

6. A. polyneura, Hook. f.; panicle pyramidal, branches long few-fid.

lower horizontally spreading, spikelets in long, glumes opaque all with very strong close-set raised nerves, I 1-3-nerved, II 5-nerved, fi. gls. ovate-lanceolate tip 2-dentate 7-9-nerved, keels of palea pectinately ciliate.

NILGRIBI HILLS; Dodabetta, alt. 8000 ft., Gamble.

Stem 2-3 ft., rather stout, strict. Leaves strict, narrow, convolute; sheaths deeply grooved, lower sparsely hairy; ligule very short, truncate. Panicle 8 in., and nearly as broad; branches 2-3-nate, smooth. Spikelets reddish-brown.—Possibly only a state of aspera, as more specimens may prove; but of a very different habit and conspicuous for the large spikelets and opaque ribbed glumes.

Sect. IV. Perennials. Spikelets erect. Fl. gls. 3-5-nerved. Ovary quite glabrous.

7. A. subspicata, Clairv. Man. Herb. 17; pubescent or tomentose. ligule oblong, panicle spiciform or ovoid strict erect dense-fid. rarely effuse, spikelets 1-1 in. 2-3-fld. ovoid-oblong very shortly pedicelled, gl. I and II subequal or II longest, fl. gls. ovate or ovate-lanceelate 2-cuspidate or shortly 2-aristate 1- or faintly 3-nerved, awn reflexed rather longer than the gl. Svensk Bot. t. 722; Reichb. Ic. Fl. Germ. i. t. 98; Griseb. in Goett. Nachr. (1868) 78; Ledeb. Fl. Ross. iv. 418. A. airoides, Koel. Gram. Gall. & Germ. 208. A. mollis, Mich. Fl. Am. Bor. i. 72. A. phleoides, Urv. in Mem. Linn. Soc. Par. iv. (1826) 601. A. toluccensis, H. B. & K. Nov. Gen. & Sp. i. 148. Trisetum airoides, Roem. & Sch. Syst. ii. 666. T. andinum, Benth. Pl. Hartw. 261; Steud. l. c. 228. T. antarcticum, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 61 (non Nees). T. groulandicum & labradoricum, Steud. Syn. Gram. 228. T. molle, Kunth Rev. Gram. i. 101, Enum. Pl. i. 296; Torrey Fl. N. York, ii. 452, t. 154; Steud. l.c. T. phleoides, Kunth l. l. c. 101, 295 (non Trin.). T. spiciforme, Dulac Fl. Haut. Pyren. 86. T. subspicatum, Beauv. Agrost. 88; Kunth Enum. i. 295, Suppl. 248; Duthie Grass. N. W. Ind. 31; Hook. Fl. Bor. Am. ii. 244; Hook. f. Fl. Antarct. i. 97, ii. 396, Handb. N. Zeal. Fl. 335; Benth. Fl. Austral. vii. 588; Steud. l.c. 225. T. toluccense, Kunth. Revis. l.c. 297, t. 60, Enum. l.c. 296; Steud. l.c. Aira spicata, Linn. Sp. Pl. Ed. II. 95 (non Ed. I.); Fl. Dan. t. 228. Aira subspicata, Linn. Syst. Ed. X. 873; Host Gram. Austr. ii. 33, t. 45; Wulf. in Jacq. Collect. iii. t. 19, f. 3. Koeleria aristata, Loisel. Fl. Gall. Ed. II. i. 66. K. spicata, Willk. & Lange Prodr. Fl. Hisp, i. 72. K. subspicata, Mart, ex Reichb. Fl. Germ. Excurs. 49.

ALPINE and SUBALPINE HIMALAYA and TIBET, alt. 10-18,000 ft. (18,500 ft. in

Kunawur, Jacquemont).—Distrib. Alpine, Arctic, and Antarctic regions.

Stems densely tufted, 6-24 in., strict, stout or slender, always pubescent or tomentose. Leaves flat, soft, hairy, rarely glabrate, lower sheaths loose. Panicle 2-4 in., from shortly oblong to cylindric, rarely interrupted or lobed with a few very short spreading lower branches. Spikelet: yellowish-green, purplish, or white, densely imbricating; rachilla short, hairy; gl. I and II more or less unequal, nearly as long as III, keels scaberulous; I 1-nerved; II 3-nerved; fl. gls: glabrous or puberulous, tip sometimes almost entire; callus bearded; awn inserted 1-1 way below the tip, column slightly twisted but sometimes awn shorter than the gl. and straight; keels of palea scabrid. Lodicules oblong, 2-fid. Anthers short. Ovary fusiform, glabrous. Grain fusiform, compressed.

8. A. Clarkei, Hook. f.; stem very slender and branches of panicle pubescent or tomentose, ligule very short, panicle slender spiciform interrupted, spikelets narrow $\frac{1}{6}-\frac{1}{4}$ in. 2-3-fld. glabrous sessile or shortly pedicelled, gl. I and II unequal, fl. gls. narrowly lanceolate acuminate tip

2-aristulate 1- or sub 3-nerved, awn longer than the gl. recurved or reflexed column not twisted.

KASHMIB; at Laka and Budrawur, alt. 10-11,000 ft. CHAMBA; Dalhousie, alt. 8700 ft., Clarke.

- Stem 1-2 ft. Leaves 4-8 in., flaccid, softly hairy on both surfaces; sheath with spreading or reflexed soft hairs. Panicle 3-5 in., erect or inclined, rachis slender; lower branches solitary or flaccided, rarely 1 in. long. Spikelets erect, pale brown, shining, rachilla penicillate with very long hairs; gls. hyaline as in A. subspicata, but longer and narrower.—Very near A. subspicata, but much more slender, with a longer loose panicle of shining much narrower spikelets, with obsolete side nerves.
- 9. A. micans, Hook. f.; stem and rachis of panicle pubescent or tomentose, leaves glabrous, ligule short lacerate, panicle contracted elongate ovoid or linear interrupted dense fld., branches short flowering to the base, spikelets \(\frac{1}{2}\) in densely imbricate silvery hyaline 3-5-fld. quite glabrous, gl. I and II very unequal 3-nerved, fl. gls. lanceolate obscurely 5-nerved, tip acuminate shortly 2-aristate, awn inserted \(\frac{1}{2}\) way from the tip very slender as long as the gl. column not twisted.

Western Himalaya; Garwhal, banks of the Ganges, alt. 8-10,000 ft., Duthic. Stems 12-18 in., densely tufted, rather stout, leafy. Leaves 6-12 in. flat, narrow, rigid, finely acuminate strongly nerved, smooth or scaberulous; sheath quite smooth; ligule reuiform, membranous. Panicle 3-4 in. by \(\frac{1}{2}\)-1\(\frac{1}{2}\) broad, erect or inclined, strict or subflexuous; lower branches solitary, densely flowering to the base. Spikelets very pale greenish yellow; rachilla slender, ciliate; gl. I lanceolate, II \(\frac{1}{2}\) longer than I oblong-lanceolate, keels of both scaberulous; fl. gls. with bearded calli; awn straight or recurved; keels of palea minutely scabrid. Lodicules narrow, cleft. Anthers linear. Ovary obovoid, quite smooth, style bases close together.—Quite unlike any other Indian species, but very near A. virescens, Regel of Turkestan which has flaccid leaves and an entire tip of fl. gls.

10. A. flavescens, Linn. Sp. Pl. 80; tall, slender, quite glabrous, ligule long, panicle effuse flexuous inclined or nodding branches capillary few-fld. naked below, spikelets \(\frac{1}{2} \) in 2-3-fld brown shining rachilla slender, gls. spreading, I and II unequal hyaline narrow I 1-nerved, II 3-nerved, fl. gls. narrowly lanceolate 3-nerved tip acuminate 2-aristate, awn stout inserted \(\frac{1}{2} \) way below the tip, twice as long as the gl. base twisted. Fl. Dan. t. 1507; Host Gram. Austr. iii. 27, t. 38; Engl. Bot. t. 952; Knapp Gram. Britt. t. 89; Reichb. Ic. Fl. Germ. t. 99; Ledeb. Fl. Ross. iv. 417; Grieb. in Goett. Nachr. (1868) 78. Trisetum flavescens, Beauv Agrost. 88; Kunth Enum. Pl. i. 298, Suppl. 252, t. 19, f. 2; Roiss. Fl. Orient. v. 537.

TEMPERATE HIMALAYA; Sikkim, alt. 12-13,000 ft., J. D. H.-DISTRIB. Europe

N. Asia, Japan, N. Africa.

Stem 2-3 ft. Leaves 6-18 in., flat, finely acuminate, more or less hairy; sheaths smooth; ligule elongate, membranous, lacerate. Panicle 3-5 in., quite glabrous, lower branches solitary or 2-nate. Spikelets larger than in most other species of this section, the awn longer; rachilla nodose below the fl. gls., penicillate with long hairs; gls. I and II lanceolate, acuminate; fl. gls. chartaceous with hyaline margins and tips, keels scaberulous as are the keels of the palea. Lodicules short, 2-lobed. Anthers small. Grain narrow.

11. A. aenea, Hook. f.; stem glabrous, ligule short rounded, panicle spiciform dense-fid oblong or linear simple or lobed, branches very short, spikelets 1-1 in. 2-3-fid. densely imbricating sessile or very shortly pedicelled dark or pale brown shining, glumes hyaline I 1-nerved, II 1-3-

nerved, fl. gls. cvate faintly 5-nerved tip acuminate 2-aristate, awn twice as long as the gl. or less reflexed, column twisted. Trisetum aureum, Nees ex Steud. Syn. Gram. 225 (non Tenore); Duthie Grass. N.W. Ind. 3. T. aeneum, Hack. mss.

WESTERN HIMALAYA, alt. 11-12,000 ft., from Kashmir to Kumaon.

Stem erect, 1-2 ft., stout or slender. Leaves 6-10 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., glabrous or hairy, as are the sheaths. Panicle 3-4 by \(\frac{1}{2}\)-1 in. diam., erect, strict, or very narrow looser-fld. and flexuous; rachis branches and pedicels quite glabrous. Spikelets erect; rachilla penicillate; glumes not widely spreading, all acuminate; I lanceolate; II \(\frac{1}{2}\) longer, oblong-lanceolate; fl. gls. rather longer than II, keel scaberulous as are the keels of the palea. Grain fusiform, compressed.

12. **A. sikkimensis,** Hook.f.; tall, slender, stem and panicle quite glabrous, ligule short rounded, panicle narrow elongate effuse nodding flexuous, branches few-fid. capillary, spikelets $\frac{1}{4}$ in 3-4-fid. sessile or shortly pedicelled pale or brown, rachilla not long, gls. I and II unequal acute hyaline glistening, fi. gls. coriaceous ovate 2-aristate, 1-3 nerved, chartaceous smooth, awn inserted $\frac{1}{4}$ way below the tip as long or nearly twice as long as the gl. reflexed column twisted.

SIRKIM HIMALAYA; Lachen and Lachoong Valleys, alt. 10-11,000 ft., J. D. H. Stem 2-3 ft. Leaves 6-12, by \(\frac{1}{2}\)-\frac{1}{2} in., more or less hairy, flat, flaccid; sheaths glabrous except near the mouth. Panicle 6-10 in.; branches subsecund, fascicled, \(\frac{1}{2}\)-1 in. long, naked below. Spikelets usually 4-fld., sometimes nearly as brown as in A. flavescens.

13. A. flaccida. Hack. mss.; very slender, quite glabrous, panicle small open, branches few capillary spreading, spikelets few pedicelled 3-fld. ½ in. long white and rose-colrd., rachilla long slender scaberulous, gls. I and II very unequal subulate-lanceolate, I and II 3-nerved, fl. gls. ovate-lanceolate acute 5-nerved, awn inserted a little below the tip as long as the gl. straight column not twisted.

The PANJAB; Black Mts., alt. 8-9000 ft., Duthie (n. 7609 in part).

A foot high. Leaves 4-6 by 1-1 in., quite glabrous; ligule short, rounded. Pasicle 3 in. long, branches rather distant. Spikelets erect; gl. I much shorter and narrower than II; fl. gls. smooth, glabrous, chartaceous, white in the lower half pale rose in the upper, margins and tip hysline, nerves very slender; awn very delicate; keels of narrow palea smooth. Lodicules lanceolate. Ovary pyriform, quite smooth, style bases rather distant.—Described from a single insufficient specimen.

DOUBTFUL SPECIES.

A. BENGHALENSIS, Schwaegr. Breit. es Steud. Nom. Ed. I. 94. I have no clue to this plant, which is not taken up in Ed. II of Steudel's Nomenclator.

A. PILOSA, M. Bieb. Fl. Taur. Cauc. iii. 84; Grissb. in Goett. Nachr. (1868) 78 Tibet, Schlagintweit.—I have seen no Tibetan specimen of this, for which Griesbach is the authority.

83. DANTHONIA, DC.

Annual or perennial grasses. Spikelets 2- or more fid. (fis. all perfect or the uppermost male) panicled, erect, not jointed on their pedicels; rachilla hairy and jointed at the base and between the fi. gls., produced beyond

the uppermost gl. Glumes 5 or more, I and II empty, subequal, as long as the whole spikelet, persistent, keeled, acute or acuminate; fig. gls. dorsally rounded, ciliate, 7-9-nerved, 2-fid, lobes acute at the base or awned and with a rigid twisted awn in the sinus; palea broad. Lodicules 2, fleshy. Stamens 3. Styles free. Grain free within the membranous or hardened gl. and palea.—Species about 100 enumerated.

1. D. himalaica. Hook. f.: leaves as long as the stem wirv. panicle 3-4 in contracted few-fld., branches and pedicels very short, spikelets few 3-1 in., 5-6-fid., gls. I and II unequal 6-7-nerved, fig. gls. sparsely hairy 9-nerved, lateral awns 0.

KUNAWAR: Jaunsar, on Lokardi Peak, alt. 8-9000 ft., Duthie.

Siems 12-18 in., densely tufted, filiform. Leaves convolute, erect, quite smooth, deeply ribbed in the inner surface; sheath short, smooth; ligule in., hyaline, lacerate. Panicle of 4-8 erect spikelets; rachis and short erect pedicels, smooth, Gls. I and II pale brown, much longer than the fig. gls., finely acuminate, margins hyaline, I 6-7-nerved; II longest, 7-nerved; fig. gls. 1-1 in., pale green, 2-fid; awn straight, base strongly twisted; callus silkily villous; palea short, obtusely 2-lobed, keels scabrid. Ledicules clavellate. Anthers as long as the pales. Ovary ovoid, hirsute, styles short, stigmas long.

2. D. exilis, Hook. f.; stem and leaves filiform, panicle short contracted recemiform few-fid., branches and pedicels very short, spikelets } in. 3-5-fld., gl. I and II unequal 1-3-nerved, fl. gls. villous, lateral awns very short.

KASHMIR; Tilail and Bargil, alt. 9-11,000 ft., Clarke; Gurail, alt. 8-9000 ft., Duthie.

Stem 3-10 in., densely tufted, very slender. Leaves 3-5 in., convolute; ligule short. Panicles 1-1 in., erect or cernuous, 6-10-fld., green or brownish, branches and pedicels smooth. Spikelets erect; rachilla very short between the upper gls.: gl. I and II scarious, lanceolate, acuminate, 1-nerved or obscurely 3-nerved at the base, I the shortest; fig. gls. much shorter than II, oblong, coriaceous, faintly 7-nerved, cleft nearly to the middle, lateral awns as long as their gl., median twice as long erect; callus densely bearded; palea linear-lanceolate, 2-toothed, sparsely hairy; nerves strong, scabrid. Grain obovoid, smooth, glabrous.

3. D. cachemyriana, Jaub. & Sp. Illustr. Pl. Orient. iv. 46, t. 331; stems ascending from a stout woody stock, leaves very long narrow convolute, panicle contracted, spikelets $\frac{3}{4}$ — $\frac{3}{4}$ in., gl. I and II subequal 3-7-nerved, fig. gls. sparsely hairy, lateral awns much longer than gl. II. D. kashmiriana, Duthie in Atkins. Gaz. N.W. Ind. 630, Grass. N.W. Ind. 32; Griseb. in Goett. Nachr. (1868) 78.

TEMPERATE and Alpine Himalaya, and W. Tiber, alt. 10-14,000 ft.

Stem 1-2 ft., densely tuited, or creeping below and clothed with shining sheaths. Leaves as long as the stem or longer, erect, flexuous, wiry, glabrous; sheaths glabrous, or lower rarely tomentose; ligule a pubescent ridge. Paniole most variable in number and disposition of the spikelets, erect, 4-5 in. long, with 30 or more close erect spikelets # in. long, or more lax with fewer (3-4 or more) spikelets on longer or shorter rarely spreading branches and pedicels, the latter smooth hairy or scabrid. Spikelets 2-5-fld., erect, pale, rather shining; rachilla more or less hairy; gis. I and II membranous, sometimes purple, rarely very sparsely hairy, keels smooth; I rather the smallest, nerves very variable, more or less trabeculate; fig. gls. much smaller, linear-lanceolate, cleft about 1 way down, 9-nerved; lateral awns as long as the gl. or longer, exserted, median strongly twisted often to

the tip, variable in length, about twice that of gl. II; callus bearded; palea as long as the gl., linear, obtuse, keels nearly smooth. Anthers linear. Grain narrowly oblong, glabrous.—A very variable plant in panicle but constant in habit. Jaubert and Spach's figure is of a very starved small form, and I have not found in Jacquemont or other specimens the whorl of hairs at the top of the pedicel (base of gl. I and II) which they represent. The nervation of gl. I and II varies remarkably. I find both 3-nerved in Sikkim specimens, both 5-nerved in many Western Himalayan; both sub 7-nerved in Kunawur ones; both 4-nerved in Simla ones; I 3-nerved, II 5-nerved in some Western; I 5-nerved, II 7-nerved in Garwhal; I 5-nerved and II sub 6-nerved in Jacquemont's n. 260, in which the awn is twisted to the tip; both are very sparsely hairy in a few specimens. The lower sheaths are villous in Simla (Hattu) specimens.

Var. minor; stems 6-8 in. very slender, leaves filiform, panicle often recurved, spikelets 4-8, gl. I and II often purple 5-7-nerved. Danthonia No. 2. Herb. Strach. & Winterb.—Alpine Himalaya, from Garwhal to Sikkim, alt. 12-14,000

ſt.

4. D. Cumminsii, Hook. f.; stem ascending, leaves filiform, panicle small, rachis and pedicels villous, spikelets 3-6 \(\) in. long very shortly pedicelled, lateral awns of gl. III very short, median not twice as long as gl. II hardly twisted.

BHOTAN; Gnatong in the Sikkim frontier, alt. 12,000 ft., Cummins.

Possibly a form of *D. cachemyriana*, but the characters are marked. The specimens are curved in a semi-circle, no doubt from growing amongst rocks, as was the case with *Calamagrostis tripilifera*, var. (p. 262).

DOUBTFUL SPECIES OF DANTHONIA.

D. GRIFFITHIANA, C. Muell. in Bot. Zeit. xiv. (1856) 374.—Khasia Hills, Griffith.—Judging by the description this is not a Danthonia, but I have formed no idea of what it may be.

84. DUTHIELA, Hack.

No. 123 in Clavis, p. 8.

Tufted perennial erect glabrous grasses. Leaves linear, subconvolute. Spikelets 3-5-fid., often bracteate, in a short simple unilateral raceme, laterally subcompressed, not jointed on the pedicels, uppermost fl. imperfect; rachilla articulate. Gls. I and II empty, persistent, lanceolate, acuminate, 7-11-nerved, dorsally rounded; fl. gls. herbaceous, oblanceolate, 7-11-nerved, 2-fid, awned in the sinus, margins membranous, awn half-twisted; palea 2-keeled, keels scabrid, excurrent. Lodicules 0. Stamens 3. Ovary hispid, narrowed into a slender style; stigmas very long, papillose, exserted from the top of the spikelets. Grain oblong, crowned with the style, hirsute.—Species 2, Western Himalaya and Affghanistan.

D. bromoides, Hack. in Verhandl. Zool. Bot. Ges. Wicn. (1895) 200; spikelets 3-5-fld., rachilla hairy, gl. I and II 7-11-nerved margins narrowly hyaline, fl. gls. obtusely 2-lobed dorsally hairy below, style about as long as the stigmas. Stapf in Hook. Ic. Pl. t. 2474.

KASHNIB, alt. 12-13,000 ft., Jacquemont, Duthie. WESTERN TIBET, alt. 12,000

ft., Thomson, Clarke. Brenda Pass, KUNAWUR (Herb. Saharunpore).

Stems 18-24 in., slender, compressed, scaberulous above. Leaves 6-12 in., rather rigid, cauline very short, flat, acute; sheaths compressed, of uppermost inflated embracing the raceme; ligule oblong. Raceme 1-2 in., inclined, rachis scabrid. Spikelets 5-6, subsessile, ovoid, about 1 in. long (without the awns) green; bracts

scarjous: gl. I often faintly nerved; II 7-nerved, subaristate; fig. gls. oblanceolate, hairy below the middle, lobes obtuse; awn \ -1 in., scabrid, obscurely geniculate. Ovary narrow, style 1-i in. long. — A remarkable grass, the character and affinities of which are discussed at length by Hackel, who places it next to Bromus, where it will be found (No. 123) in the clavis of this work, p. 8. The recognition by Dr. Stapf of a second species, D. oligostachya, Stapf (Avena oligostachya, Munro in Journ. Linn. Soc. xviii. (1880) 108, name only, Aitchison l. c. xix. (1882) 193, t. 30) proves the position of the genus to be near Danthonia, where I had placed it, before its publication by Hackel, when I deferred to that author's high authority.

Tribe VIII. CHLORIDE E. (See p. 6.)

84. MICROCHLOA, Br.

Slender perennial grasses. Leaves filiform, convolute. Spikelets very narrow, 1-fld., minute, 2-seriate, unilateral on a solitary terminal filiform curved spike, not jointed at the base, awnless; rachilla jointed at the base. not produced beyond gl. III. Glumes 3, I and II empty, membranous, 1-nerved, keeled, persistent; III very small, oblong, hyaline, awnless; palea as long as the gl., keels ciliate. Lodicules 2, truncate. Anthers linear. Styles distinct. Grain oblong, fusiform, glabrous, free within the hyaline gls.—Species 3, two confined to Africa and the following.

M. setacea, Br. Prodr. 208; H. B. & K. Nov. Gen. & Sp. i. 84, t. 22; Beauv. Agrost. 115, t. 20, f. 8; Nees Agrost. Bras. 441; Fl. Afr. Austr. 247; Kunth Enum. Pl. i. 258, Suppl. 201; Doell in Mart. Fl. Bras. ii. III. 76, t. 21; Steud. Syn. Gram 202; Benth. Fl. Hongk. 428, Fl. Austral. vii. 608. M. elongata, Br. in Wall. Cat. n. 3807. Rottboellia setacea, Roxb. Corom. Pl. ii. 18, t. 132, Fl. Ind. i. 357. Nardus indica, Linn. f. Suppl. 105.

BENGAL, Roxburgh, on walls. NEPAL, Wallich. KHASIA HILLS, alt. 4-6000 ft., J. D. H. & T. T., Clarke. CENTRAL PROVINCES; Chanda, Duthie. NILGHIRI HILLS, Perrottet.—DISTRIB. Tropics of Old and New World.

Stems tufted, 6-10 in., wiry. Leaves as long as the stem, curved, glabrous or sparsely hairy; ligule very short, ciliate. Spike 2-10 in., with the spikelets 10-1 in. diam.; rachis slender, dorsally rounded. Spikelets 15 in., close-set, alternating in two unilateral rows, erect; gls. I and II subequal, lanceolate, acute, twice as long as III, which is o btuse, hairy, nerveless; palea lanceolate, 2-toothed.

85. GRACILEA, Koen.

Small grasses. Leaves short. Spikelets 1-2-fld. (fl. unisexual?) collected in turbinate awned deciduous spicate clusters which are secund. sessile and jointed on a filiform or capillary flexuous terminal rachis; rachilla not jointed, sometimes produced beyond gl. IV and bearing an imperfect fl. Glumes 4-6; I and II narrow, rigid, ciliate with long hairs, narrowed into long rigid scabrid awns, I narrowest; II with broad hyaline margins; III and IV broadly ovate, membranous, scaherulous, 3-nerved, shortly awned, tip entire or 2-cuspidate; palea as broad as the gl., 2-cuspidate. Lodicules cuneiform. Anthers small. Grain oblong. free. -Species, 2 Indian and African.

1. G. nutans, Koen. in Ges. Naturf. Fr. Neue Schrift. iv. (1803) 218: perennial? leaves lanceolate. Melanocenchris Rothiana, Nees in Proc. Linn. Soc. i. (1841) 95; Wight Cat. n. 1768; Dalz. & Gibs. Bomb. Fl. 297. M. Perrottetii, Jaub. & Sp. 11l. Pl. Or. IV. 39, t. 326. Pommereulla monoeca, Rottl. l. c.; Roth. Nov. Sp. 33 (monoica); Kunth Enum. Pl. i. 321; Wall. Cat. n. 8905 excl. D.

MYSORE and the CARNATIC, Heyne, &c. CSYLON; Mannar district, Trimen.

Stems 6-8 in., stout and decumbent below, erect or geniculately ascending.

Leaves \(\frac{1}{2} - \) lin., narrowed from the subcordate base to the acute tip, rigid, margins setosely serrulate; ligule of short hairs. Spikes and clusters of spikelets as in G. Royleana, but tip of gl. III entire, IV bicuspidate.

2. G. Royleana, Hook. f.; annual, leaves filiform. Melanocenchris Royleana, Nees in Proc. Linn. Soc. i. (1841) 95; Aitchis. Cat. Panjab Pl. 168 (excl. Syn.); Duthie Grass. N.W. Ind. 33, Fodd. Grass. N. Ind. 54, t. 67; Lisboa in Journ. Bomb. Nat. Hist. Soc. viii. (1893) 370. M. Jacquemontii, Jaub. & Sp. Ill. Pl. Or. iv. 36. Pommerculla monica, Wall. Cat. n. 8905 D. P. Royleana, Steud. Nom. Ed. II. ii. 379. Amphipogon humilis, Herb. Ham. ex Wall. Cat. l.c.—Roylea, Nees ex Steud. l.c. 475.

The Panjab Plain, Hamilton, Royle, &c., eastwd. to Delhi, Clarke. Raj-POOTANA, CENTRAL INDIA, the CONCAN, CANABA, and SCIND.—DISTRIB. Socotra, Nubis.

Stems 3-8 in., densely tufted, very slender. Leaves 1-2 in., flat or convolute, glabrous or margins below and sheaths setulose; ligule a ridge of hairs. Spikes filiform, 1-2 in., flexuous, often reclined or recurved; rachis 3-gonous, smooth; clusters of spikelets \(\frac{1}{2}\)-\frac{1}{2} in. long including the awns, green or purple; awns of gl. I and II longer than the gls., of III very short.

Var. plumosa; clusters of spikelets 1 in. including the awns. M. plumosa, Jaub. & Sp. l. c. 37; Hochst. in Flora (1855) 273, 417. Pennisetum plumosum, Hochst. ew Steud. Syn. Gram. 201. Ptilonema plumosum, Steud. l. c. Eutriana abyssinica, Br. ew Fresen. in Mus. Senkenb. ii. (1837) 142.—The Panjab, Jhelum River, Aitchison. Scind, Stooks. Arabia, Abyssinica.

. 86. ENTEROPOGON, Nees.

Slender perennial grasses. Leaves long, very narrow. Spikelets very narrow, 1-2-fld. (lower fl. perfect upper if present male or neuter) unilateral in a solitary terminal slender spike, not jointed at the base; rachilla jointed at the base. Glumes 3 or 4; I and II unequal, narrow, hyaline, 1-nerved, persistent; III much larger, linear, rigid, scabrid, dorsally rounded, 3-nerved, tip entire, or acutely 2-fid with a short erect awn in the cleft; callus bearded; pales lanceolate, 2-toothed, keels scabrid. Lodicules 2. Anthers very long. Styles distinct. Grain narrow, free within the hardened gls.—Species, an African, and the following.

E. melicoides, Nees in Lindl. Introd. Nat. Syst. Ed. II. 449; Wall. Cat. n. 8893; Wight Cat. n. 1757; Trim. Cat. Ceyl. Pl. 109. Eutriana enteropogon, Steud. Syn. Gram. 216. Ischmum melicoides, Koen. ex Rottl. in Ges. Naturf. Neue Fr. Schrift. iv. (1803) 211. Otenium seychellense, Baker Fl. Maurit. 452. Festuca mysorensis, Heyne ex Roem. & Sch. Syst. ii. 600. PRottboellia triacantha, Roth. Nov. Sp. 43. R. pilosa, Roth. in Roem. & Sch. l. c. 785.

MYSORE, Heyne, Wight. BURMA; Shan Hills, Collett. CEYLON, Trimen.—DISTRIB. Scychelle Islds.

Stems 1-3 ft., densely tufted, wiry. Leaves nearly as long as the stem, up to \(\frac{1}{2}\) in. broad, flat or convolute, tip capillary; liquid of long hairs. Spikes 6-10 in., the xuous or curved, rachis dorsally rounded. Spikelets \(\frac{1}{2}\)-\frac{1}{2}\) in., loosely imbricate, rarely 2-seriate; gls. I and II glistening; III opaque, with a very thick raised midril; awn about = the gl.

87. TRIPOGOM, Roth.

Slender densely tufted grasses. Leaves usually convolute. Spikelets many-fid. (fl. all but 1-2 terminal perfect), 2-seriate and unilateral on a very slender terminal spike, not jointed at the base; rachilla produced between the glumes, jointed at the base. Glumes many, I and II unequal, distantly superposed, 1-nerved, empty, persistent; I usually lodged in a furrow of the rachis, and toothed or lobed on one side; II entire or notched below the mucronate or apiculate tip; III and following ovate, dorsally convex, 2-fid, and awned in the cleft, or 4-fid with the outer lobes awned, the inner membranous and rarely awned; palea broad or narrow, complicate. Lodicules 2. Stamens 3. Styles very short. Grain very narrow, free.—Species about 10, trop. and subtrop. Asia and Africa.

The species of Tripogon are very closely allied, and though dissimilar in many respects, are so variable in all, that they form an almost inextricable plexus. The most distinct are T. capillatus, pauperculus, Wightis, and abyssinicus, of which the latter almost passes into Jacquemontii. Glume I is remarkable from being in most species inequilateral, one margin being deeply notohed, or dilated suddenly below the middle into a wing or lobe or segment, which is sometimes displaced and appears as a small 3rd or lowest empty glume. The subequal symmetrical glumes of T. pauperculus and Wightis are unusual in the genus.—The length of the awns, and of the lobes of the gl. III vary in each species; and there is every intermediate between the species with two simple awned lobes one on each side of the median awn, as in T. trifdus, and the quadrifid top of the gl. of T. filiformis.—The species grow promiscuously on rocks or trunks of trees.

- * Flg. glumes simply 2-fid with an interposed awn, the lobes awned or not.
 - † Awn as long or longer than its glume.
- 1. T. capillatus, Jaub. & Spach. Illustr. Fl. Orient. iv. 47, t. 332; gl. I and II narrowly lanceolate acuminate or awned, III villous at the base, awn many times longer than its gl. flexuous. T. capitatus (err. typ.) Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 371.

BEHAR; on Parusnath, J. D. H., Clarke. Western Ghats; from the Concan to the Nilghiri Hills, Jacquemont, &c.

Stem very slender. Leaves 6-10 in., convolute. Spike 6-12 in., filiform or capillary, flexuous. Spikelets remote, \(\frac{1}{10}\)-\frac{1}{2}\) in., few-fid., green; gl. I sometimes very minute, at others nearly as long as II both sometimes awned, membranous with a broad defined nerve; lateral teeth of III shortly awned; median awn so slender as to be barely visible.

2. T. pauperculus, Stapf in Hook. Ic. Pl. t. 2442; dwarf, stems capillary, gl. I and II lanceolate subaristately acuminate symmetrical, III villous at the base, lateral lobes long-awned median-awn not twice as long as the gl.

WESTERN GHATS; near Poons, on stems of trees, Woodrow.

Stems 2-3 in., densely tusted, leafy to the tip. Leaves setuceous, involute, upper

much longer than the spike, acute; sheaths striate, lower lax; ligule ovate, obtuse. Spikelets 1-3, remote, 1-4-fid.; gl. I and II 1-nerved, gl. I shorter than II; fig. gls. 1-4 with 1-2 empty above them, linear-oblong, 3-nerved; lateral lobes with capillary awns; median awn twisted at the base; palea oblong, keels ciliolate. Anthers minute, subglobose. Grain narrowly linear, cylindric.

3. **T. trifidus**, Munro, ex Stapf in Kew Bulletin (1892) p. 85; spikelets \(\frac{1}{2} - \frac{1}{2} \) in., gl. I lobed on one side, II narrowly lanceolate acuminate entire or notched below the tip, III villous at the base, awn twice as long as the gl. or longer.

SIRKIM HIMALAYA, alt. 5-6000 ft., J. D. H. MISHMI HILLS, Griffith. KHASIA HILLS, alt. 4-5500 ft., Griffith. (Kew Distrib. n. 6633, 6634).—DISTRIB. Tonkin.

Stem 8-18 in. Leaves 6-10 in. Spikes 2-12 in., stout or slender. Spikelets 3, close or distaut, 4-10-fld.; gl. I lanceolate, acuminate or aristate, broadly lobed on one side, the lobe sometimes detached; II much longer, lanceolate, acuminate or 2-toothed with a short awn; III and following bearded at the base; lateral lobes simple, lanceolate, and awned or irregularly toothed in the inner margins, or rarely with a small tooth at its inner base; awn usually twice or thrice as long as the glume, erect and flexuous, or recurved; palea elliptic-oblong, obtuse, keels scabrid.—In the Sikkim specimens gl. I and II are sometimes very long lanceolate aristately acuminate with the lobe of I placed lower down, in others gl. I is much shorter than II, with a broad lateral lobe towards its base; in others again gl. I is deeply notched on one side towards the tip only; gl. II is 2-toothed below the tip and has 5 contiguous strands on the thickened disk; gl. III and its palea are longer and narrower than in any Khasia form, where, however, the plant is so variable that I hesitate to regard the Sikkim one as a different species.

4. **T. Wightii**, Hook f.; spikelets $1-1\frac{1}{2}$ in 10-30-fid., gl. I and II subequal linear-oblong tip 2-toothed and mucronate, awn recurved as long or twice as long as its gl.

MYSORE; at Bellary (1834) Wight (n. 1793?).

Spikes 6-8 in., rachis as stout as a sparrow's quill. Spikelets 10-12, from \(\frac{1}{2} - 1 \) in. apart; gl. I and II linear-oblong, membranous, hyaline, with a strong defined midrib; III rather narrow, base bearded, lateral lobes lanceolate not awned; palea oblong, keels obscurely scabrid.—A very distinct species, of which there are only spikes in Wight's Herbarium. Bellary is a botanically unexplored district.

†† Awn shorter than its gl

5. **T. Lisbose,** Stapf in Kew Bulletin (1892) 86; spikelets $\frac{1}{6}-\frac{1}{3}$ in. 5-12-fid., gl. I lanceolate obtusely toothed on one side, II twice as long linear-oblong coriaceous apiculate, awn of III very short. Leptochloa tripogonoides, Munro mss. ex Lisboa l. c. Tripogon, n. 5, Herb. Ind. Or. H.f. & T. Tripogon sp. nov., Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 370.

RAJPUTANA; Mt. Abu, Duthie. The Concan, Canara, and Mysobe, Jacquemont. &c.

Stem stout or slender, in Jacquemont's specimen 3 ft. high and as thick as a duck's quill below. Leaves 1-2 ft. by \(\frac{1}{2}\) in., quite smooth, flat or convolute. Spikes 6-10 in.; rachis stout or slender, strict. Spikelets usually densely crowded; glumes coriaceous; lobes of III short membranous not awned, base very shortly bearded; awn \(\frac{1}{2}\) the length of its gl. or shorter; palea oblong, keels scaberulous.—The difference in stoutness of stem and spike, and of size of the spikelets is remarkable.

6. T. Jacquemontii, Stapf in Kew Bulletin (1892) 85; spikelets 1-1 in 10-20-fld., gl. I lanceolate lobed on one side, II 1 longer ovate-

lanceolate coriaceous nerve broad or narrow 2-toothed below the tip, awn half as long as its gl. or shorter. Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 370. T. bengalensis, Munro mss.

Bengal; Griffith (Kow Distrib. n. 6636). Malwa, the Concan and Deccan, Jacquemont. &c.

Stem very slender, 1-2 ft. Leaves filiform. Spikes 6-10 in., slender. Spikelets crowded or not; glumes subcoriaceous, uppermost flowerless; lobes of III ovate, acute, not awned, base shortly bearded; awn straight, variable in length; palea

oblong, keels scaberulous.

Var. submuticus; gl. I subulate-lanceolate slightly oblique towards the base very much smaller and narrower than II, awn hardly longer than the lobes of the gl. T. submutica, Hack. in Herb. Duthie.—Western Himalaya; below Kotgurh, Thomson. Simla, alt. 7-8000 ft., Duthie.—The habitat is far removed from that of all other species. Duthie's specimen has the excessively slender habit and all other characters of the type but those above given. Thomson's are much shorter, with shorter leaves, and are intermediate between Jacquemont's and the following.

7. **T. abyssinicus**, Nees ex Steud. Syn. Gram. 301; dwarf, very slender, spikelets $\frac{1}{8} - \frac{1}{6}$ in. 6-8-fld., gl. I very small ovate or subulate-lanceolate unequal or lobulate-sided, II coriaceous linear-oblong 2-3-toothed below the tip, III 2-toothed at the truncate tip, awn minute. T. minimus, Horhst. ex Steud. l.c. T. bromoides, Benth. in Gen. Pl. iii. 1200; Duthie Grass N.W. Ind. 33 (not of Roth.). T. festuccides, Clarke ex Duthie l.c. Danthonia leptophylla, A. Rich. Tent. Fl. Abyss. ii. 421. Festuca filiformis, Steud. l.c. Catapodium filiforme, Nees ex Steud. l.c. C. fusiforme, Benth. in Journ. Linn. Soc. xix. (1881) 128 (error for filiforme).

WESTERN HIMALAYA; from Kashmir to Simla, alt. 5-7000 ft., Royle, &c.

WESTERN PANJAB, Stewart, &c .- DISTRIB. Affghan., Tropical Africa.

Stem 6-10 in. Leaves 2-6 in., filiform. Spikelets always very small and usually rather distant; glumes rather thin, narrow; I membranous, nerve strong; II linear-oblong, with a narrow membranous margin, base bearded, tip sometimes erose and 2-mucronate.

- ** Fl. glumes 4-fid, outer lobes awned or not, inner membranous sometimes very short or truncate.
- 8. T. bromoides, Roth. Nov. Sp. 49; spikes long or short, spikelets $\frac{1}{6}-\frac{1}{3}$ in. few- or many-fld., gl. I ovate or lanceolate deeply notched on one side, II oblong-lanceolate bifid with a short awn in the cleft, III with small awned outer lobes broad ovate acute, inner and median awn shorter than the gl. Wall. Cat. n. 8387; Wight Cat. n. 1793; Steud. Syn. Gram. 301; Stapf in Kew Bullet. (1891) 85. T. festucoides, Jaub. & Spach Ill. Fl. Orient. iv. 49, t. 333. T. Griffithii, Wight & Arn. ex Wight Cat. n. 2658; Nees ex Steud. l.c. 301. T. lanatus, Hochst. ex Steud. l.c. T. Neesianus, Wight & Arn. ex Wight Cat. n. 2059. T. zeylanicus, Nees ex Wight Cat. n. 2360; Steud. l.c.; Thwaites Enum. 374; Trim. Cat. Ceyl. Pl. 109. Triathera bromoides, Roth. ex Kunth l.c. Bromus Myurus & Festuca mysurensis, Herb. Heyne. Plagiolytrum calycinum, Nees in Proc. Linn. Soc. i. 95; Wight Cat. n. 1793 & 2059. Avena mysorensis, Spreng. Syst. i. 337.

MALABAE GHATS; from Belgaum southward, alt. 4-7000 ft. CEYLON; in the elevated districts.

Stems 6-18 in., stout or slender. Leaves usually short, but sometimes as long as the stem, flat or convolute, and filiform. Spike 3-8 in. Spikelets very variable, close or distant. Gls. I membranous, nerve stout; II membranous, or coriaceous

with broad membranous margins, more deeply notched or bifid at the apex than in any other species; III and following bearded at the base, broadly ovate, strongly 3-nerved, cleft hulf way down, outer lobes small placed low down and margined with their awns half as long as the gl. or longer, inner lobes often half as long as the gl., much larger than in any other species; awn rarely as long as its gl.

Var. major, Stapf mss.; stem 2-4 ft., leaves 5-6 in. narrow flat spreading, spike 4-6 in., spikelets } in. bifarious 16-20-fld.—Nilghiri Hills, Nadavattam, alt.

6000 ft., Lawson. Pulney Hills, Wight.

Var. longifolius; stem 2 ft., leaves filiform as long as the stem, spike 3 in.,

spikelets in. secund 8-10 fld. - Nilghiri and Pulney Hills.

9. **T. filtformis**, Nees ex Steud. Syn. Gram. 301; very slender, leaves filiform as long as the stem, spikes 3-10 in., spikelets \$\frac{1}{2} - \frac{1}{2}\$ in., gl. I ovate broadly lobed on one side, It linear-oblong or lanceolate 2-toothed below the tip, III with small shortly awned outer lobes, and short or long obtuse acute or awned inner, median awn twice as long as its gl. or longer. Duthie Grass. N.W. Ind. 33. T. semitruncatus, Nees, & T. unidentatus, Nees ex Steud. l. c.; Duthie l. c. Plagiolytrum filiforme and unidentatum, Nees in Proc. Linn. S. i. 95. Catapodium filiforme, Nees ex Duthie l. c.

—Tripogon, Wall. Cat. 8888, 8889.

TEMPERATE HIMALAYA, from Dalhousie to Bhotan, alt. 5-10,000 ft. Khasia Hills, alt. 5-5500 ft., Wallich, &c.

Habit of T. trifidus and only to be distinguished by the acute obtuse or awned long or short teeth or lobes between the 3 awns of gl. III, and perhaps only a form of that plant. The longer awns and minute teeth of the top of gl. II best distinguish it from T. bromoides.

VAB. tenuispica; spike very slender, rachis filiform, spikelets very small pale, awn of gl. III long and slender. Tripogon, Wall. Cat. n. 8892.—N.W. Himal., Sikkim

and the Khasia Hills.

88. CYNODON, Pers.

Perennial creeping grasses. Leaves narrow, flat. Spikelets minute, 1-fld., 1-2-seriate, unilateral on 3-6 digitate slender spikes, not jointed at the base; rachilla jointed at the base, not produced beyond gl. III or at its back only. Glumes 3, I and II empty, thin, keeled, persistent or separately deciduous; III broader, membranous, awnless; palea as long, 2-nerved. Lodicules 2, short. Anthers large. Styles distinct. Grain oblong, free within the gls.—Species 4, 3 Australian and the following.

C. dactylon, Pers. Syn. i. 85; gl. I and II shorter than III, rachilla produced at the base of gl. III dorsally as a minute bristle. Kunth Enum. Pl. i. 259; Suppl. 203, t. 16, f. 1; Reichb. Ic. Fl. Germ. t. 26; T. Nees Gen. Fl. Germ. Monocot. i. n. 19; Wall. Cat. n. 3803; Dalz. & Gibs. Bomb. Fl. 297; Griff. Notul. iii. 50, Ic. Pl. Asiat. t. 139, f. 204; Thwaites Enum. Pl. Zeyl. 371; Trim. Cat. Ceyl. Pl. 109; Aitchis. Cat. Panjab. Pl. 160; Duthie Gruss. N.W. Ind. 32, Fodd. Grass. N. Ind. 52; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 366; Benth. Fl. Hongk. 428; Fl. Austral. vii. 609. C. erectus, Presl Rel Hænk. i. 290, Kunth l. c. 260. C. filiformis, Voigt Hort. Suburb. Calc. 712. C. linearis, Willd. Enum. Hort. Berol. 90; Wight Cat. n. 1750. C. maritimus, H. B. & K. Nov. Gen. & Sp. i. 170. C. occidentalis & portoricensis, Willd. ex Steud. Nom. Ed. II. i. 463. C. radiatus, Roth. Nov. Pl. Sp. 38; Kunth l. c. 260. C. repens, Dulac Fl. Haut. Pyren. 76. C. sarmentosus, S. F. Gray Nat. Arr. Brit. Pl. ii. 100. C. stellatu, Willd. Enum. Hort. Berol. 90; Kunth l. c. 260. C. virgatus,

Nees ex Steud. Syn. Gram. 213. Chloris Cynodon, Trin. Gram. Unifl. 229. Chlor. maritima, Trin. l. c. 226. Fibichia umbellata, Koel. Gram. Gall. & Germ. 308. Dactylon officinale, Vill. Hist. Pl. Dauph. ii. 69. Digitaria Dactylon, Scop. Fl. Carn. Ed. II. i. 52. D. littoralis, Sulisb. Prodr. 19. D. maritima & radiata, Spreng. l. c. 272. D. stolonifera, Schrod. Fl. Germ. i. 165, t. 3, f. 9. Panicum dactylon, Linn. Sp. Pl. 58; Host Gram. Austr. ii. 15, t. 18; Sibth. Fl. Grec 45, t. 60; Engl. Bot. t. 840; Knapp Gram. Britt. t. 13; Grah. Cat. Bomb. Pl. 236; Roxb. Fl. Ind. i. 289. P. lineare, Burm. Fl. Ind. 25, t. 10, f. 2. Paspalum dactylon, DC. Fl. Franc. iii. 16. Pasp. præcox. Walt. Fl. Carol. 75. Pasp. umbellatum, Lam. Illust. i. 177. Agrostis bermudian, Tusvac ex Kunth l. c. 259. A. filiformis, Koen. ex Kunth l. c. 261. A. linearis, Retz. Obs. iv. 19. A. stellata, Willd. Sp. Pl. i. 376.—Rheede Hort. Mal. xii. t. 47.

Throughout India, Burma and Ceylon, ascending to 5000 ft. in the Himalaya.

-- DISTRIB. All warm countries.

Stem prostrate, often widely creeping and forming matted tufts with short ascending branches. Leaves short, subulate, glaucous; ligule hairy. Spikes 2-5, 1-2 in., radiating, green or purplish; rachis very slender. Spikeles about $\frac{1}{\sqrt{3}} - \frac{1}{\sqrt{3}}$ in.; gl. I and II spreading, ovate, acute, keels scabrid; III much larger cymbiform, keel and margin scabrid. Grain laterally compressed.—This plant is absent in Herb. Wallich. (Cat. n. 3803).

89. CHLORIS. Sw.

Perennial rarely annual grasses. Leaves flat or convolute. Spikelets 1-fld., 2-seriate, unilateral on solitary geminate fuscicled digitate or whorled terminal erect or radiating spikes, not jointed at the base; rachilla jointed at the base, sometimes produced beyond gl. III and bearing one or more empty gls. Glumes 3 (with 1 or more upper neuter), I and II unequal, 1-nerved, narrow, keeled, acute mucronate or II awned; III 1-3-nerved, acute obtuse or 2-fid, usually awned; palea rather shorter, 2-nerved, complicate. Lodicules 2. Anthers small. Styles free. Grain narrow, free. Species about 40, warm regions.

This genus is wanting in the Wallichian Herbarium at the Linnean Society.—I find no character by which Schanefeldia, Kunth, can be separated generically from Chloris.

Spikelets 1-fld. with no rudiment of another. Rachis of spike flattened.

1. C. pallida, Hook f.; annual, very slender, spikes 1-3 ½ in. broad, awn very long capillary. Schoenefeldia pallida, Edg-w. in Journ As. Soc. Beng. xxi. (1852) 161, 183; Aitchis. Cat. Panjab Pl. 166; Duthie Grass. N.W. Ind. 32, Fodd. Grass. N. Ind. 52, t. 64. S. gracilis, Kunth Revis. Gram. i. 283, t. 53; Enum Pl. i. 258; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 365.

BUNDELKUND, Edgeworth. CENTRAL INDIA, King.

Stem 10-18 in., simple or branched, almost filiform. Leaves 6-8 in., very narrow, flaccid, tips capillary; ligule a few hairs. Spike 3-5 in., golden-yellow, erect; rachis flattened, servulate. Spikelets 1 in., subsessile, gl. I and II ovate-lanceolate, subaristately acuminate, 1-nerved, keels ciliate; I \(\frac{1}{2}\) and training interpretable large bearded, tip minutely notched; awn \(\frac{1}{2}\)-1 in. long, capillary, carved; palea narrow, keels ciliate, tip 2-toothed. Grais very slender, acute, pericarp loose.—I have seen no authentic

specimen of Edgeworth's plant, but have received one so named from Dr. Kirg. It agrees with Edgeworth's characters except in respect of an obscure passage in that author's description which reads as if gl. III was much shorter than II.

2. C. myosuroides, Hook. f.; annual, spikes solitary or geminate in broad, awn very long capillary.

GANGETIO PLAIN: ravines near Etawah. Duthie.

A much smaller plant than C. pallida, 6-12 in high, with very narrow spikes 2-3 in long, often recurved, smaller spikelets and shorter awns, \(\frac{1}{2}\)-\(\frac{3}{2}\) in long, but perhaps only a variety.

- ** Spikelets 1-fld., rachilla produced beyond the flg. gl. and bearing one or two awns. Rachis of spike terete or angular.
- 3. **C. delicatula**, Clarke mss.; annual, spikes 5-10 capillary $1\frac{1}{3}$ -2 in. long alternate on the tip of the stem, awns $\frac{1}{8}$ - $\frac{1}{8}$ in. straight.

CHOTA NAGFORE; Mandu, Hazarabagh, Clarke. Pegu-Yomah, Herb. Kurz. Stem 3-12 in., erect, slender, wiry, subsimple. Leaves \(\frac{1}{2}\)-1 in., all cauline, spreading, subulate, concave or convolute; ligule of hairs. Spikes erect. Spikelets about \(\frac{1}{10}\)-\frac{1}{2}\) in.; gl. I very narrow, almost subulate; II \(\frac{1}{2}\) longer, rather broader, both setuceously acuminate, keels scaberulous; III oblong, finely hairy, tip 2-lobed; rachilla produced and half as long as the gl., bearing 2-3 capillary awns; palea narrow, 2-toothed, keels glabrous. Grain very narrow, cylindric.—The Pegu specimens are larger than Clarke's.

4. C. incompleta, Roth. Nov. Sp. 60; tall, perennial, spikes 4-10 whorled 4-6 in. long, awns \(\frac{1}{2}\) in. straight. Steud. Syn. Gram. 207. C. digitata, Steud. L.c.; Duthie Grass. N.W. Ind. 23; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 369 (excl. Syn.). C. radiata, Heyne er Roth. L.c. 61; Thw. Enum. Pl. Zeyl. 371; Trim. Cat. Ceyl. Pl. 409. C. Royburghii, Edgew. in Journ. As. Soc. Beng. xxi. (1853) 160, 183; Duthie Fodd. Grass. N. Ind. 54, t. 65; Lisboa l. c. 368. C. tetrameris, Trin. Gram. Unifl. 235; Steud. l. c. 206. Digituria elongata, Spreng. Syst. i. 271. Gymnopogon digitatus, Nees in Wight Cat. n. 1753; Steud. Nom. Ed. II. i. 713. Melica digitata, Roxb. Fl. Ind. i. 326; Kunth Enum. Pl. i. 37. Ctenium digitatum, Spreng. Syst. i. 274. Cynodon elongatus, Trin. in Spreng. N. Entdeck. ii. 64; Kunth l.c. Agrostis filiformis, Koenig in Herb. Banks. ex Trin. l. c.

Throughout the PLAINS of INDIA, from the Panjab to Burma and southward. CETLON. ANDAMAN ISLDS., Kurz.—DISTRIB. Affghan., China.

Stem 2-3 ft., or more, stout or slender, often branched, straight or geniculate. Leaves 6-12 by \(\frac{1}{2}\)-\frac{1}{2}\) in., flat; ligule of long hairs. Spikes very slender, spreading. Spikelets very variable, \(\frac{1}{2}\)-\frac{1}{2}\) in., narrowly lanceolate, green; gl. I not \(\frac{1}{2}\) of II which is narrowly lanceolate notched and shortly awned at the tip; III as long as II, ovate-lanceolate, tip 2-toothed, base bearded; palea very narrow, keels nearly smooth; rachilla produced to half the length of the gl., bearing a very minute long awned gl. that is bearded at the base.

- *** Spikelets 1-fld.; rachilla produced beyond the fig. gl., and bearing 1-3 reduced empty gls. (In *C. villosa*, the gl. IV contains imperfect anthers.)
 - † Spikes 1-3; gl. III broadly cuneiform.
- 5. C. tenella, Roxb. Fl. Ind. i. 329; annual, slender, spike solitary, spikelets 3-4-awned, gl. III broadly cuneiform, upper margin truncate naked. Kunth Enum. Pl. i. 267; Spreng. New Entdeck. iii. 126; Steud.

Syn. Gram. 204; Dalz. & Gibs. Bomb. Fl. 296; P Duthie Fodd. Grass. N. Ind. 54, t. 66; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 368. C. triangulata, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 409; Stewd. l.c. 203; Duthie Grass. N.W. Ind. 33. Ctenium indicum, Spreng. Syst. i. 274. Tetrapogon triangularis, Hochst. Pl. Arab. Schweinf. n. 967.

RAJPOOTANA; Oodeypore, Wingate (Herb. Duthie) .. Scind, Stocks. Khandrish,

Dalzell. South India, Roxburgh, Wight. - Distrib. Arabia, Abyssinia.

Stem 10-18 in. weak, branched from the base. Leaves 6-10 by \$-\frac{1}{2}\$ in., flaccid; ligule short, truncate. Spike 1-2\frac{1}{2}\$ in., erect, flat. Spikelets large, \$\frac{1}{2}\$ in. long and more, bifarious; gls. 5 or 6, I and II ovate-lanceolate, hyaline; I acute; II \$\frac{1}{2}\$ longer, shortly awned; III as long as II, coriaceous, nerves distant from the margin and keel villous; awn subdorsal, straight, spreading; keels of palea finely hairy; IV half as long as III, narrower; V and VI still smaller, fan-shaped, awned.

- tt Spikes 1-3; gl. III ovoid, hirsute all over.
- 6. C. villosa, Pers. Syn. i. 87; perennial, stout, spikes 1-3, spikelets 4-awned, gl. III ovoid acute hirsute all over with long hairs, margins hyaline. Kunth Enum. Pl. i. 267, Suppl. 217, t. 16, f. 3; Jaub. & Spach Ill. Pl. Orient. iv. 40, t. 327; Coss. & Dur. Fl. Alger. 87; Steud. Syn. Gram. 204; Aitchis. Cat. Panjab Pl. 167. C. tetrapogon, Beauv. Agrost. 158. Tetrapogon villosus, Desf. Fl. Atlant. ii. 388, t. 255; Trin. Fund. Agrost. 760; Boiss. Fl. Orient. v. 555; Duthie Grass. N.W. Ind. 33, Fodd. Grass. N. Ind. 55, t. 68.

The Panjab; Peshawur, Stewart; Rawul Piudu, Aitchison. Rajpootana; Oodeypore, King. Multan, Edgeworth.—Distrib. Westward to the Canaries.

Stem 6-10 in., from a densely-tufted stout woody base, which is clothed with

Stem 6-10 in., from a densely-tufted stout woody base, which is clothed with equitant leaf-sheaths. Leaves 1-3 in., very narrow, acute, flat or twisted, rig'd; ligule obscure. Spikes 1\frac{1}{2}-2\frac{1}{2}\

††† Spikes 4-10; gl. III bearded at the base and on the margins above the middle.

7. C. virgata, Sw. Fl. Ind. Occ. i. 203; spikes 6-9, spikelets 2-awned, gl. II tip 2-tid awned in the sinus, III ovate bearded with long hairs above the middle, IV narrowly caneiform. Trin. Gram. Unifl. 136; Doell in Mart. Fl. Bras. ii. III. C. compressa, DC. Cat. Hort. Monsp. (1813) 94; Trin. Gram. Unifl. 230; Nees Agrost. Bras. 421, Fl. Afr. Austr. 240; Steud. Syn. Gram. 204. C. caudata, Trin. ex Bunge Enum. Pl. Chin. Bor. 70. C. cryptostachys, Steud. in Schmidt. Fl. Cap. Virid. 148. C. decora, Nees in Herb. Royle; Steud. l. c. 205. C. elegans, Kunth Enum. Pl. i. 264. C. meccana, Hochst. & Steud. ex Schult. Ind. Sem. Hort Hal. (1843) 7; Steud. l. c.; Boiss. Fl. Orient. v. 554; Duthie Grass. N.W. Ind. 33. C. montana, Griseb. in Goett. Nachr. (1868) 84, Abhandl. 300; Duthie l. c. (non Roxb). C. pallida, Link Hort. Berol. i. 56, ii. 223. C. penicillata, Hort. ex Nees l. c. (non Poir.). C. polydactyla, Durand Diss. Chlorid. (1808) 14, 22; Jacq. Eclog. Gram. 12, t. b (non Sw.). C. tetrastachys, Hack: mss. (ex Herb. Duthie). Heterolepis elegans, Ehrt. ex Boiss. l. c.; Rabdochloa virgata, Beauv. Agrost. 84.—Chloris, Wall. Cat. 3212 (in Herb Benth.).

RAJPOOTANA, and UPPER and LOWER GANGETIC PLAINS, and southward to BEHAE, and CENTEAL and SOUTHERN INDIA. WESTERN TIBET, Thomson. BURMA, Wallick.—Distris. Westward to Algeria; China, Mongolia, Trop. and S. Africa and America.

Stem rather stout, flattened, 8-12 in. high, usually leafy, decumbent and much proliferously branched below. Leaves rather broad, flat, acute; upper sheaths more or less inflated.—Australian specimen of this in Herb. Kew from Mueller, are ticketed C. barbata, Muell., var. with one empty gl. The Western Tibet habitat is remarkable; there are two specimens collected by Thomson, dated by himself at a time he was in Ladak, at an elevation not less than 12,000 ft.

8. C. barbata, Sw. Fl. Ind. Occ. i. 200; spikes 4-20, rachis scaberulous, spikelets 3-awned. Jacq. Eclog. Gram. 10, t. 8; Kunth Enum. Pl. i. 264, Suppl. 209; Durand de Chlorid. 13, 22; Trin. Diss. i. 232, Sp. Gram. Ic. t. 306; Nees Agrost. Bras. 421; Steud. Syn. Gram. 204; Roxb. Fl. Ind. i. 331; Grah. Cat. Bomb. Pl. 234; Wight Cut. n. 1764; Aitch. Cat. Panjab Pl. 167; Thw. Enum. Pl. Zeyl. 371; Trim. Cat. Ceyl. Pl. 109; Duthie Grass. N.W. Ind. 33, Fodd Grass. N. Ind. 53, t. 34; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 367; Griseb. Fl. Brit. W. Ind. 539; Benth. Fl. Hongk. 429, Fl. Austral. vii. 613 (excl. Syn. decora); Doell in Mart. Fl. Bras. ii. III. 67. Andropogon barbatus, Linn. Pl. Jam. Pugill. 30, Mant. ii. 302.—Chloris, Wall. Cat. n. 3812.—Rheede Hort. Mal. xii. t. 51.

Throughout the plains of INDIA, BURMA, and CEYLON.-DISTRIB. Tropics

generally.

- Stem 1-3 ft., stout, erect from a geniculate or from a creeping proliferously branched base, simple or branching above, nodes with often large tufts of leaves having compressed equitant sheaths. Leaves 6-18 long, flat; mouth of sheaths ciliate; ligule obscure. Spikes \(\frac{1}{2}\)-4 in., suberect, strict or flexuous. Spikeles \(\frac{1}{10}\)-\frac{1}{2} in., green or red-purple; gls. I and II acuminate, II much the longest; III ovate, more or less densely bended above the middle and dorsally, tip acute or notched; awn \(\frac{1}{2}\)-\frac{1}{2} in.; III caneiform, at length globose, ciliate; IV much smaller, globose, awned.—Extremely variable in size and habit.
- 9. C. polystachya, Roxb. Fl. Ind. i. 330; spikes many, rachis glabrous, spikelets very minute 3-awned. Kunth Enum. Pl. i. 265; Spreng. Neue Entdeck. iii. 127; Gruh. Cat. Bomb. Pl. 235; Wight Cat. n. 1763; Duthie Grass. N.W. Ind. 33, C. Roxburghiana, Schult. Mant. ii. 239; Steud. Syn. Gram. 206.—Chloris, Wall. Cat. n. 3811 (ex Wight l. c.).

DECCAN PENINSULA, Roxburgh, Wight.

Stem 1-2 ft., ascending from a procumbent base. Spikes about 16, 2-3 in. long; gls. I and II lanceolate, acuminate; II much the longest; III ovate, acute, margins ciliate above or nearly glabrous; awn flexnous, IV like III but very much smaller, glabrous; V a minute-awned gl.—Wight's is the only specimen I have seen, it is very much smaller than in Roxburgh's drawing.

10. C. montana, Roxb. Fl. 1nd. i. 329; spikes 2-0, rachis glabrous, spikelets 4-awned. Kunth Enum. Pl. i. 205; Spreng. New Entdeck. iii. 127; Steud. Syn. Gram. 204; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 369. C. decora, Thw. Enum. 371 (excl. syn.). C. barbata, var. decora, Trim. Cat. Ceyl. Pl. 109. Tetrapogon tetrastachys, Hack. in Herb. Duthie (in part) n. 7759. Andropogon tetra-aristatus, Roxb. Ic. ined. n. 882.—Chloris, Wall. Cat. n. 3810.

Mountain districts of COROMANDEL, Rosburgh. UPPER and LOWER GANGETIC PLAINS, and southward to CEYLON.

Stem erect or geniculately ascending from a creeping base, 4 in. to 21 ft., simple

or branched. Leaves 3-8 in., narrow, finely acuminate; mouth of sheath ciliate; ligule very short. Spikes 1-3 in., erect, very pale. Spikelets \(\frac{1}{2}\) in.; gl. I and Il both finely acuminate, or II which is much the largest obtuse and shortly awned; III ovoid, acute, upper margins more or less thickly bearded; IV and V cuneiform, glabrous or ciliate; VI minute, awned.—Very variable in the length of the spikes and size of the spikelets.

11. C. Wightlana, Ness in Wight Cat. n. 1766; Steud. Syn. Gram. 206; spikes 3-5, rachis villous, spikelets 4-awned.—Chloris, Wall. Cat. n. 3809.

SOUTHERN INDIA, Wight.

Stem 4-6 in., stout, much branched, decumbent and leafy below, sometimes creeping. Leaves 2-4 by \(\frac{1}{2-\frac{1}{2}}\) in., flat, linear, acuminate and sheaths pubescent; ligule of hairs. Spikes red-brown, stout. Spikelets, gl. I and II ovate-lanceolate; I acdminate; II \(\frac{1}{2}\) longer, tip notched mucronate; III as long as II, obliquely broadly ovate in profile, suddenly narrowed into the terminal awn, lateral nerves marginal above and keel villously bearded; palea very broad, keels ciliate; IV like III but smaller; V subglobose, glabrous, VI very minute.

DOUBTFUL AND REJECTED SPECIES.

C. MONOSTACHYA, Poir. Encycl. Suppl. ii. 238.—C. distachya (Kunth Rev. Gram. i. 291, t. 57. Eleusine monostachya, Spreng. Syst. i. 249. Leptochloa? monostachya, Reaum. & Sch. Syst. ii. 580. Cynosurus monostachyas, Vahl Symb. ii. 20) is a Mauritian grass, not found hitherto in India.

C. PENICILLATA, Pers. Syn. i. 87; Kunth Enum. Pl. i. 268; Steud. Syn. Gram 206. Cynosurus penicillatus, Vahl Symb. ii. 21. Eleusine penicillata, Spreng. Syst. i.

350.—Vahl's description does not enable me to identify this.

90. ELEUSINE, Gaertn.

Annual or perennial grasses. Leaves long or short. Spikelets 3-12-fid. (fi. all but terminal perfect) sessile, 2-3-seriate and secund, forming digitate capitate or whorled spikes, laterally compressed, not jointed at the base; rachilla continuous between the fi. glumes. Glumes few or many, keeled, I and II shorter than the fig., subequal or unequal, persistent; I lanceolate; II lanceolate, acute or acuminate, or very broadly ovate, or didymous with a short stou recurved awn; fig. gls. like the empty 3-nerved; pales complicate, keels strong. Lodicules 2, cuneate. Anthers 3, short. Styles short, distinct. Grain free, pericarp hyaline, loose. Seed rugose.—Species about 7, all warm countries.

The specimens of this genus are absent from the Wallichian Herbarium in the Linnean Society's rooms; the tickets alone existing there.

- I. ELEUSINE proper. Spikelets densely imbricate, pointing forward. Gl. II obtuse acute or acuminate.
- 1. B. indica, Gærtn. Fruct. i. 8; annual, erect, leaves flat, spikes digitate elongate, glumes subacute glabrous. Lamk. Ill. i. 203, t. 48; Kunth Enum. Pl. i. 273, Suppl. 224, t. 16, f. 4; Sleud. Syn. Gram. 211; Roxb. Fl. Ind. i. 345; Grah. Cat. Bomb. Pl. 235; Griff. Notul. iii. 52, 53, Ic. Pl. Asiat. t. 119, f. 156 & t. 150, f. 1; Thw. Enum. Pl. Zeylan. 371; Trimen Cat. Ceyl. Pl. 109; Aitchis. Cat. Panjab Pl. 168; Duthie Grass. N.W. Ind. 34, Fudd. Grass. N. Ind. 57, t. 69; Mig. Fl. Ind. Bat. iii. 385; Wall. Cat. n. 3816; Wight Cat. v. 1758; Boiss. Fl. Orient. v. 555; Benth. Fl. Hongk. 429, Fl. Austral. vii. 615; Necs Agrost. Bras. 439, Fl. Afr. Austr. 251; Griseb. Fl. Brit. W. Ind. 540. E. distachyu, Trin. cz Stud.

Nom. Ed. II. i. 549. E. distans, Manch. Meth. 210. E. domingensis, Sieb. ex Schult Mant. ii. 323. E. Gouini, iusequalis, rigidifolia, & scabra, Fourn. ex Hemsl. Biol. Centr. Amer. iii. 565. E. gracilis, Sulisb. Prodr. 19. E. marginats, Lindl. in Mitch. Three Exped. i. 319; Steud. Syn. Gram. 212. E. tristachys, Lamk. l. c.; Kunth Revis. Gram. i. 92, Enum. i. 273; Steud. l. c. Cynosurus indicus, Linn. Sp. Pl. 72. C. Ara, Herb. Ham. ex Wall. Cat. n. 3816 I. PC. pectinatus, Lamk Encycl. ii. 188. PLeptochlon pectinats, Kunth Revis. Gram. i. 91, Enum. Pl. 272; Steud. l. c. 210. Paticum compressum, Forsk. Fl. Eg. Arab. 18. Paspalum dissectum, Kniphof. Cent. Bot in Orig. t. 11. Triticum geminatum, Spreng. Syst. i. 326. Agropyrum geminatum, Schult. Mant. iii. 655.—Rheede Hort. Mal. xii. t. 69.

Throughout the low country of INDIA (ascending to 5000 ft, in the Himalaya) to PENANG and CEYLON,—DISTRIB. Tropical Old World; introd. into the New.

Stem 1-2 ft., stout, soft. Leaves distichous, narrow, flaccid, acuminate; sheaths flattened, ciliate; ligule obsolete. Spikes 5-7, 2-5 in. long, all in a terminal whorl; or with sometimes 1 or 2 lower down. Spikelets very variable in size, \(\frac{1}{3} - \frac{1}{6}\) in., 3-5-fid.; quite glabrous; gl. I small, 1-nerved; II 3-nerved; III and succeeding ovate, subacute. Grain oblong; pericarp loose, but persistent; seed oblong rugose.

CULT. FORM. E. CORACANA, Gaertn. Fruct. i. 8, t. 1; stem stout 2-5 ft. often as thick as the thumb, leaves broad, spikes very stout up to 6 in. long by \(\frac{1}{2}\) in. broad straight or incurved, grain globose. Lamk. Illustr. t. 28; Schreb. Gram. ii. t. 35; Trin. Sp. Gram. Ic. t. 70; Steud. Syn. Gram. 211; Panz. in Muench. Denkschr. iv. (1811) t. 8; Nees Fl. Afr. Austr. 251; Kunth Enum. Pl. i. 273, Suppl. 225; Roxb. Fl. Ind. i. 342; Wall. Cat. n. 3817; Grah. Cat. Bomb. Pl. 235; Aitchis. Cat. Panjab Pl. 168; Trim. Cat. Ceyl. Pl. 109; Duthie Grass. N.W. Ind. 34, Fodd. Grass. N. Ind. 57, t. 69, Field & Gard. Crops, 15, t. 28; Miquel Fl. Ind. Bat. iii. 386; Lisboa in Journ. Bomb. Nat Hist. Soc. vii. (1893) 373. E. cerealis, Salisb. Prodr. 19. E. sph@rosperun, Stokes Bot. Mat. Med. i. 49. E. stricts, Roxb. l. c. 343; Kunth l. c.; Steud. l. c. E. Tocussa, Fresen. in Mus. Senkenb. ii. (1817) 141. Cynosurus coracauns, Lunn. Syst. Ed. II. 875.—Rheede Hort. Mal. zii. t. 78.—Cultivated in all parts of India.

2. E. flagellifera, Nees in Linnwa, xvi. (1842) 220; perennial, prostrate, proliterously branched, leaves very short glaucous, spikes digitate, gl. II lanceolate mucronate or aristulate, III hairy acute. Steud. Syn. Gram. 211; Duthie Grass. N.W. Ind. 34, Fodd. Grass. N. Ind. 57, t. 37; Boiss. Fl. Orient. v. 655. E. arabica, Hochst. ex Steud. l.c.; Aitchis. Cat. Panjab Pl. 167; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 377. E.? stolonifera, Br. in Salt Abyss. App. 63. ? Ochthocloa dactyloides, Edgew. in Journ. As. Soc. Beng. xi. (1842) 27.

PLAINS of the PANJAH, Royle, Jacquemont, &c. SCIND, Stocks, &c.—DISTRIB.

Affghau, and westward to N. Africa.

Stems stout or slender, smooth, stiff, widely spreading, rooting at the distant thickened leafy nodes, and sending up slender branches; internodes 4-8 in. Leaves \(\frac{1}{2}-\frac{1}{2}\) in., rigid, recurved, flat or tortuous; ligule hairy. Spikes 3-6, 1-1\frac{1}{2}\) in. long, very variable in breadth, \(\frac{1}{2}-\frac{1}{2}\) in.; rachis pubescent. Spikelets imbricate, sub-pèdicelled, \(\frac{1}{2}-\frac{1}{2}\) in. long, 4-6-fld., green or brownish; gl. I small, ovate, acute, membranous; II twice as large, coriaceous with membranous margins; III ovate-lanceolate, acuminate, chartaceous, 3-nerved, mid-nerve compound, sides and membranous margins below hary; palea elliptic-oblong, keels hairy.—Ochthocloa dactyloides, Edgew., is a doub-ful plant of which I have seen no specimens. It is not included in any of Duthie's works on the Grasses of N.W. India. It might be traced by its habitat. Loodiana, Jassowala, on tumuli with Capparis aphylla.

3. E. brevifolia, Br. in Wall. Cat. n. 3815; annual, stems short

creeping and rooting, leaves small lanceolate acuminate, spikes very many short crowded in globose heads, fig. gls. and palea villously bearded. E. oligostachya, Herb. Wight, n. 3332. E. Wallichii, Munro mss. Koeleria brevifolia, Spreng. Pugili. ii. 21. K. lagopoides, Panz. ex Spreng. l. c. Dactylis brevifolia, Koeň. ex Willd. Sp. Pl. i. 410 (excl. Syn.); Roxb. Fl. Ind. i. 341; ?Steud. Syn. Gram. 298. D. cynosuroides, Koen. ex Roth. Nov. Sp. 74 (non Linn.). D. geniculata, Roxb. Ic. Pict. ined. t. 346 (non Burm.). Poa brevifolia, Kunth Revis. Gram. i. 111, Enum. Pl. i. 324. P. lagopoides, Ness ex Wight Cat. n. 1790. Æluropus brevifolius, Ness ex Steud. Nom. Ed. II. i. 30; Herb. Wight Prop. 1792. Æ. lævis, Trin. Fund. Agrost. 143, t. 12. Æ. pubescens, Steud. Nom. l. c. Erngrostis brevifolia, Benth. in Hook. Ic. Pl. xiv. 51. Triodia cynosuroides, Spreng. Syst. Veg. i. 331. Cyperus Coracana, Herb. Heyne ex Wall. l. c.

Sandy shores of the COROMANDEL and CARNATIC coasts, Heyne, &c.

Annual. Stems many, spreading from the root, 2-4 in. long, stout or slender. Leaves 1-2 in., flaccid or rigid, lanceolate, acuminate, serrulate; ligule obsolete. Heads of spikes quite globose, \(\frac{1}{2}\)-\frac{1}{3} in. diam., of many (rarely few) 4-10-fld. ovate sessile spikelets \(\frac{1}{2}\)-\frac{1}{2} in. long; gl. I and II subequal, margius hyaline, broadly ovate, acuminate or cuspidate, glabrous; I 1-3-nerved; II 3-5-nerved, nerves close to the middle line; III and following very broadly ovate, cuspidately acuminate, 3-nerved, keel and nerves and keels of ovate palea all villous below the middle. Anthers minute. Styles long, slender. Grain orbicular.—See remarks under Eluropus.

4. 2. verticillata, Roxb. Fl. Ind. i. 346; annual, erect, leaves flat, spikes scattered or whorled very many-fld., glumes acute glabrous. Steud. Syn. Gram. 211; Aitchis. Cat. Punjab Pl. 168; Duthie Grass. N. W. Ind. 34, Fodd. Grass. N. Ind. 58. t. 70; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 377; Benth. Fl. Austral. vii. 616. E. racemosa, Heyne in Roth. Nov. Sp. 80. Leptochlon? racemosa & verticillata, Kunth Revis. Gram. i. 91, Enum. Pl. i. 272; Steud. l. c. Aerachne eleusinoides, Wight & Arn. in Wight Cat. n. 1760; Nees ex Steud. l. c. A. verticillata, Lindl. Introd. Nut. Syst. Ed. II. 381.—Eragrostidi affine, Wall. Cut. n. 3882, ex Wight Cat. l. c.

Plains of INDIA; in pasture ground, Roxburgh, &c. KASHMIB, Clarks.—DISTRIB.

Trop. Asia, Africa, and Australia.

- Stem 1-3 ft., stout or slender, simple or branched, soft. Leaves rather broad, flaccid, acuminate, glabrous; sheath compressed; ligule a few hairs. Spikes few or many, \(\frac{1}{2}\)-3 in. long, in tiers or whorls, or opposite or alternate, subcrect; rachis slender. Spikelets \(\frac{1}{2}\)-\frac{1}{2} in., 8-12 fld., shining; glumes small; I and II broadly ovate, finely acuminate or aristulate; flg. gls. \(\frac{1}{2}\)-\frac{1}{2} in., verv broadly ovate, 3-nerved, keel excurrent, lateral nerves ending in small teeth. Grain rugose, pericarp caducous.
- II. DACTYLOCTENIUM, Willd. (Gen.). Spikelets erect, at right angles to the rachis of the spike. Glume II short, suborbicular, abruptly shortly awned.
- 5. B. segyptiaca, Desf. Fl. Atlant. i. 85; annual, leaves flat, spikes digitate, glumes rigid cuspidate glabrous. Roxb. Fl. Ind. i. 344; Wall Cat. n. 3818; Griff. Notul. iii 51, Ic. Pl. Asiat. t. 139, f. 79; Irim. Cat. Ceyl. Pl. 109; Benth. Fl. Austral. vii. 615; Duthie Grass. N. W. Ind. 34, Fodd. Grass. N. Ind. 56, t. 35. E. ciliata, Rafin. in Desv. Journ. Bot. iv. (1814) 273. E. cruciata, Lank. Illustr. i. 203, t. 48, f. 2. E. mueronsta, Stokes Mat. Med. i. 150; Lieboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 376. E. pectinata, Moench Meth. Suppl. 68. E. prostrata, Spring. Syst. i. 350

E. radulans, Br. Prodr. 186. Dactyloctenium ægyptiacum, Willd. Enum. Hort. Berol. 1029; Beauv. Agrost. 72, t. 15, f. 2; Kunth Enum. Pl. i. 261, Suppl. ii. 204: Steud. Syn. Gram. 211; Grah. Cat. Bomb. Pl. 235; Dalz. & Gibs. Bomb. Fl. 297; Thv. Enum. Pl. Zeyl. 371; Aitch. Cat. Panjab Pl. 167; Mig. Fl. Ind. Bat. iii. 384; Boiss. Fl. Orient. v. 556; Griseb. Fl. Brit. W. Ind. 540; Baker Fl. Maurit. 452. D. distachyum, Bojer Hort. Maurit. 370. D. Figarei, Notar. in Ann. Sc. Nat. Ser. III. ix. (1848) 325. D. meridionale, Ham. Prodr. Pl. Ind. Occ. 6. D. mucronatum, Willd. l. c.; Trin. Sp. Gram. Ic. t. 69; Steud. l. c.; Wight Cat. n. 1761. D. prostratum, Willd. l. c.; Steud. l. c. Cynosnus ægyptius, Linn. Sp. Pl. 72. C. Cavara & Macara, Hb. Ham. ex Wall. l. c. B. C. C. distachvus, Rottl. ex Steud. Nom. Ed. II. i. 465. Chloris mucronata, Mich. Fl. Am. Bor. i. 59. Cenchrus ægyptius, Beauv. Agrost. 157. Rhabdochloa mucronata, Beauv. 24. Egilops saccharinus. Walt. Vl. Carol. i. 249:—Rheede Hort. Mal. xii. t. 69.

Throughout the low country of India and Burma, and MALACCA and CEYLON,-

DISTRIB. Warm regions of the Old World, introd. into the New.

Stem erect, 6-18 in. high, or prostrate spreading and rooting, often proliferously branched at the thickened nodes. Leaves distichous, acute or acuminate, ciliate; sheaths compressed; ligule 0. Spikes solitary or 2-5, \frac{1}{2}-1 in. long, all terminal, tout, rachis mucromate at the tip by the thickened excurrent midrib. Spikelets densely crowded, \frac{1}{3}-\frac{1}{10} in. long, 3-4-fld., glabrous; glumes almost pungent; I ovate, acute; II broadly ovate, obliquely cuspidately awned, as are the following, cusps recurved; palea very broad, 2-fld, keels hispid. Grain globose, very rough, pericarp evanescent.—Specimens in Herb. Rottler named "Cynosurus ciliaris, C. distachyus, nob, an C. agyptii, var.:—sandy shores of the Ocean," are somewhat intermediate between agyptiaca and aristata, having the foliage of the former and habit of the latter. This and Wight's n. 1761 b. "Dactyloct. mucronatum, \(\beta\). repens = D. prostratum, Willd.," are the same.

6. B. aristata, Ehrenb. ex Boiss. Fl. Orient. v. 557; pereunial, slender, prostrate, proliferously branched, leaves short glaucous, spikes very short capitate, gl. II abruptly shortly awned. E. glaucophylla, Munro ex Benth. in Journ. Linn. Soc. xix. (1881) 107. E. scindica, Duthie Fodd. Grass. N. Ind. 58, t. 36; Lisboa in Journ. Bumb. Nat. Hist. Soc. vii. (1893) 377. Ductyloctenium glaucophyllum, Courb. in Ann. Sc. Nat. Ser. IV. xviii. (1862) 133. D. scindicum, Boiss. Diagn. Ser. II. iv. 131, Fl. Orient. l. c.

The PANJAB, RAJPOOTANA, MALWA, SCIND, and BRITISH BELUCHISTAN .-

DISTRIB. Affghan., Arabia, Nubia.

Stem smooth, stiff, widely spreading, rooting at the distant thickened woody leafy nodes, and sending up very slender branches 4-12 in. long; internodes 2-4 in. Leaves 1-1\frac{1}{2} in., acuminate or pungent, margins ciliate with long tubercle-based hairs; basal sheaths hairy; ligule obsolete. Spikes 3 or more, \frac{1}{2}-\frac{1}{2} in. long, spreading or decurved, ciliate or bearded at the base, undrib of rachis excurrent. Spikelets. short, 3-4-fid., rachilla glabrous; gl. I and II coriaceous, 1 nerved, margins membranous, I small, broadly oblong, apiculate; II very broad, sometimes didymous when spread open; awn stout, subulate, incurved or recurved; III and following longer than II, very broadly ovate, subacute, glabrous; palea broad, keels scaberulous. Grain ovoid, rugose.—Habit of E. fagellifera.

91. DIMEBRA, Jacq.

An annual leafy grass. Leaves flat. Spikelets 2-3-fld., small, crowded, biscriate on one side of slender spreading or deflexed spikes that are

collected in narrow pyramidal racemes, not jointed at the base; rachilla slender, jointed at the base, produced beyond the fl. gls. and bearing an imperfect gl. Glumes 4-5, I and II empty, persistent, much longer than III and IV, lanceolate, awned, 1-nerved, keeled; II \(\frac{1}{4}\) longer than I; III and IV very small, broadly ovate, subacute, hyaline, 1-nerved; palea hyaline. Lodicules 2. Anthers 3, small. Styles free. Grain ovoid, trigonous, wrinkled, free.

D. arabica, Jacq. Fragment. 77, t. 121, f. 1; Beauv. Agrost. 98, t. 16, f. 2 (Dineba); Trim. Cat. Ceyl. Pl. 109; Duthie Grass. N.W. Ind. 34, Fodd. Grass. N. Ind. 55; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 372. D. ægyptiaca, Del. Fl. Ægypt. 25, t. xi. f. 3 (Dinaeba). D. retroflexa, Panz. in Denksch. Acad. Muench. iv. (1813) t. 12; Boiss. Fl. Orient. v. 557. Leptochloa arabica, Kunth Revis. Gram. i. 91; Enum. Pl. i. 271, Suppl. 221; Wight Cat. n. 1756; Aitch. Cat. Panjab Pl. 167. L. calycina, Kunth l. l. c. c. 91, 272; Steud. l. c. 210; Dalz. & Gibs. Bomb. Fl. 297. L. coromandeliana, Steud. l. c. 209. Eleusine calycina, Roxb. Fl. Ind. i. 346. Cynosurus coromandelianus, Herb. Rottl. C. paniculatus, Herb. Roxb. C. retroflexus, Vahl Symb. ii. 20. Dactylis pasualoides, Willd. Enum. Hort. Berol. 111. D. cynosurudes, Koen. mss. in Herb. Mus. Britt. D. madraspatensis, Herb. Roxb.—Dinebra, Wall. Cat. n. 3814.

WESTERN PENINSULA, from Khandeish and the Carnatic southward. CEYLON,

Trimen (entroduced).-DISTRIB. Affghan, and westward to Senegal.

Stems 1-3 ft., tufted, branching from the base, erect or geniculately ascending, leafy throughout. Leaves flat, 3-8 in., flaccid, finely acuminate, sparsely hairy; ligule short. Raceines 4-12 in., erect; rachis strict, stout, smooth. Spikes \frac{1}{2}-2\frac{1}{2} in., opposite alternate or whorled, sessile, green or pale yellow, shining, at first erect, at last deflexed. Spikelets closely imbricate, about \frac{1}{6} in. long; gl. I and II with straight terminal awns.—Dinebra verticillata, Wight ex Steud. Syn. Gram. 209, is Myriostachys Wightiana.

92. LEPTOCHLOA, Beauv.

Annual grasses. Leaves flat or involute. Spikelets very minute, compressed, 1-many-fld., sessile or shortly pedicelled, alternate and unilateral on the very slender spike-like branches of a lax panicle, not jointed at the base; rachilla produced between the flg. gls., jointed at the base. Glumes 3-many, membranous; I and II unequal, oblong or lanceolate, 1-nerved; III and following broadly ovate, subacute or obtuse, 3-nerved, nerves usually hairy, 2 lateral near the margin; palea nearly as long as the gl., 2-keeled. Lodicules 2, cuneate. Anthers 3, short. Styles free. Grain subglobose oblong obovoid or 3-gonous, closely invested by the gl. and palea.—Species about 12, tropical and subtropical.

I have had great difficulty in disposing of the synonymy of this genus, the species of which are in a chaotic condition, and I regard the result here attained as tentative only, some of the synonyms adopted being little better than guesses, though the results of much study. The genus is absent in the Wallichian Herbarium of the Linnæan Society.

- * Leaves short, broad, membranous.
- 1. L. uniflora, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 409; spikelets 1-fld., gl. I and II linear-lanceolate, III ovate acuminate. Trim. Cat. Ceyl. Pl. 109. L. gracilis, Wight ex Steud: Syn. Gram. 213. Cvnodon gracilis, Nees ex Steud. l.c.; Thw. Enum. Pl. Ceyl. 371; Wight Cat. n.

1752. Poa chinensis, Burm. Fl. Ind. 27, t. xi. f. 3 (non Linn.). Agrostis montana, Herb. Rottler.—Leptochloa, Wall. Cat. n. 8895.

TINNEVELLY; at Palamcotta, Rottler. CEYLON, dry parts of the island .--

DISTRIB.-Trop. Afric.

Stem 1-2 ft., very slender, geniculately ascending from a creeping base. Leaves 1-3 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., elliptic-lanceolate, acute and apiculate, very thin, flaccid, base narrowed; ligule short, hyaline, lacerate. Panicle 6-8 in., very slender; spikes capillary, 2-3 in. Spikelets about \(\frac{1}{16}\) in.; nerves of gl. III and palea fringed with long hairs. Grain not seen.—Judging from Burmann's figure of the leaf his Poachinessis is, I think, L. uniflora.

** Leaves long, narrow.

2. L. polystachya, Benth. Fl. Austral. vii. 617 (non Kunth); panicle elongate contracted, spikes $1-l\frac{1}{2}$ in. crowded erect, spikelets 1-fld. L. Neesii, Benth. in Journ. Linn. Soc. xix. (1881) 108; Trim. Cat. Ceyl. Pl. 109. Cynodon Neesii, Thw. Enum. Ceyl. Pl. 371. C. polystachyus, Br. Prodr. 187. C. virgatus, Nees ex Wall. Cat. n. 8894; Wight Cat. n. 1751; Steud. Syn. Gram. 213. Agrostis virgata, Herb. Rottl. & Herb. Madr. ex Wall. l. c.; A. chinensis, Koen. ex Herb. Rottl.

The Carnatic, Rottler, Wight. CEYLON; Trincomulce, Glenie.—DISTRIB. Australia.

Stems erect, 2-3 ft., stout or slender, sometimes proliferously branched below; lower nodes glabrous or besided. Leanes 12-18 in., convolute, rarely flat, finely acuminate. Panicle 6-10 in., flexuous; branches filiform. Spikelets $\frac{1}{3}$ in., closeset, pale; gls. I and II unequal, ovate-lanceolate, rather longer than III, pale green; III broadly ovate, subacute, 3-nerved, nerves and keels of palea ciliate. Grain oblong, deeply grooved on one side.—The form of the panicle differs much from that of the following; but the spikelets and glumes are very much alike. L. polystachya, Kunth, an American plant, is a species of Diplachne.

3. I. filiformis, Roem. & Sch. Syst. ii 580; spikes 2-3 in., sp kelets 2-3-fid. Kunth Enum. Pl. i. 270, Suppl. 220; Steud. Syn. Gram. 209; Wight Cat. n. 1754; Thw. Enum. Pl. Zeyl. 271; Trim. Cat. Ceyl. Pl. 109; Duthie Grass. N.W. Ind. 192; Aitchis. Cat. Panjab. Pl. 167; Mig. Fl. Ind. Bat. iii. 389. E. chinensis, Duthie Fodd. Grass. N. Ind. 59, t. 71. ? E. filiformis, Pers. Syn. i. 87. Aira filiformis, Roxb. Fl. Ind. i. 326; Herb. Ham. ex Wall. Cat. n. 3804. Poa malabarica, Klein ex Steud. Nom. Ed. ii. 303, 60. P. chinensis, Herb. Rottler. P. coutracta & panica, Retz. Obs. iii. 11. P. virgata, Roth. Nov. Sp. 66; Wight l.c. Festuca tenuis & F.? Basnia, Herb. Ham. ex Wall. Cat. n. 3805 C. D.—Leptochloa, Wall. Cat. 3804. 3805.

Throughout India and BURNA in the low country. CEYLON; Colombo, For-

guson.—Distrib. Trop. Asia, Africa and America.

Stem 1-2 ft., slender, geniculately ascending. Leaves 4-10 in., flat, flaccid, finely acuminate; ligule short. Pasicle 4-8 in., contracted or diffuse, branches very many almost capillary; spikelets \$\frac{1}{3}\text{in}\$ in., gl. I and II oblong-lanceolate, acute; III and IV broadly ovate, nerves and palea ciliate. Grain oblong, closely invested with the gl. and palea.—I have followed my predecessors in reterring this Indian grass to Leptochioa filiformis, R. & S., though that plant is described as American, and as having glabrous flowers; a character apparently confirmed by Jacquin's drawing of its synonym Eleusine filiformis, Pers. (Jacq. Eclog. Gram. t. iv.) and by an observation of Doell in Mart. Fl. Bras. ii III. 93. On the other hand, I find the nerves of gl. III to be invariably hairy in American specimens corresponding with Jacquin's plate and the description of L. filiformis, and hence must suspect that this very inconspicuous character (except under a good magnifying power) has been overlooked.

Amongst other grasses referred to filiformis, but which from want of materials or descriptions or both I refrain from citing, is L. tenerrima, R. & S., which is described as having a 2-lobed tip of gl. 111, a character which is approached only in L. oblusiflora, but which is easily produced in the very concave glume by a slight force in analyzing that organ. Bentham Fl. Hongk. and Fl. Austral. refers it to L. chinensis, to which its few (2-3-) fld. spikelets is opposed. It is probably a weak state of L. filiformis. With regard to Aira filiformis, Koen., in Roxb. Fl. Ind., Mr. Rendle informs me that there are in the British Museum a specimen so named by Koenig himself, and another authenticated by Roxburgh, and that both are the Indian L. filiformis. Roxburgh's characters of "leaves ensiform" and "calyx large" are therefore erroneous.

4. L. chinensis, Nees in Syll. Ratisb. i. (1824) 4, Agrost. Bras. 432; stem tall stout, spikes 2-4 in.; spikelets 4-6-fld., gl. iii. obtuse and apiculate. Miq. Fl. Ind. Bat. iii. 389 (escl. Syn. Burm.). Steud. Syn. Gram. 209; Benth. Fl. Hongk. 430, Fl. Austral. vii. 617; Thw. Enum. Pl. Zeyl. 371; Trim. Cat. Ceyl. Pl. 109; Wall. Cat. n. 8896; Wight Cat. n. 1755; Duthie Grass. N.W. Ind. 35 (excl. syn.), Fodd. Grass. N. Ind. 59, t. 71; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 372 (excl. Syn. tenerrima). E. decipiens & imbecilla, Steud. l. c. 279. Cynodon virgutus, Nees in Wight Cat. n. 1751. Poa as henes, Roem. & Sch. Syst. ii. 574. P. decipiens, Br. Prodr. 181. P. chinensis, Linn. Sp. Pl. 69 (excl. Syn. Burm.); Roxh. Fl. Ind. i. 332. P. malabarica, Retz. Obs. v. 19. P. secundaria, Heyne in Herb. Rottl.

Throughout India and Burma, in moist places. Crylon, Atakalam Corle,

Thwaites .- DISTRIB. China, Japan, Malaya, Australia.

Stem erect, or geniculately ascending, 2-4 ft., often as thick as a goose-quill, Leaves 6-18 in., flat or convolute, scaberulous; sheaths loose; ligule short, lacerate. Punicle 6-18 in.; branches opposite or alternate, subcrect or spreading. Spikelets about $\frac{1}{10}$ in.; nerves of gl. III and keels of pulea pilose. Grain loose, obtasely trigonous, subrugose. - A much more robust species than L. filiformis, but some of its forms are quite as slender as is that plant.

5. L. obtusifiora, Horkst. in Flora, xxxviii. (1835) 203; stem stout tall, panicle branches few erect, spikelets in 6-fld., gl. III oblong-ovate tip truncately rounded or retuse erose, grain obovoid triquetrous. Steud. Syn. Gram. 209. Poa maysorensis, Rottler mss.

SOUTHERN INDIA; Cochin, at Ayacotta, Rottler. (June 10th, 1808).—DISTRIE.

Afr. trop.

Stem 2 ft. and upwards, erect, branched, leafy. Leaves narrow. Panicle of 9-12 simple erect branches 2-3 in. long. Spikelets alternate, sessile, as in L. chinensis, but larger with fl. glumes 1/2 in. long, more oblong, with broad more or less truncate toothed tips, sometimes emarginate or retu-e with an apiculus; keels of pulea quite smooth. Grain larger than in chinensis, triquetrous, ventrally depressed.—Rottler's specimen is imperfect; he has labelled it "Poas species malabarica proxima, P. maysorensis, nob," and added the above description of the stem leaves and panicle, which exactly accord with African ones. It is very near L. chinensis, but of the great many plants of that species which I have examined none have the large spikelets and glumes of this. The habitat is an old fortified town near Cochin, that had great trade with Africa, whence the plant was probably introduced with merchandise.

DOUBTFUL INDIAN SPECIES.

I. CYNOSUBOIDES, Room. & Sch Syst. ii. 579; Kunth Enum. Pl. i. 270; Steud. Syn. Gram. 208. . L. filiformis, Beauv. Agrost. 71. Cynosurus filiformis, Vahl Sumb. ii. 20. Chloris filiformis, Poir. Encycl. Suppl. ii. 238. Pollinia filiformis, Spreng. Syst. Veg. i. 288; spike solitary, spikelets 3-fid.—Probably not a Leptochlog.

93. DICHETARIA, Steud.

A tall slender perennial grass. Leaves long, narrow, flat. Spikelets 1-fld. with the very long filiform gl. of a 2nd, sessile or shortly pedicelled, distantly scattered along a very long filiform rachis, very narrow, terete, not jointed at the base; rachilla not produced beyond gl. III, jointed at the base. Glumes 4, I and II unequal, empty, separately deciduous, narrowly lanceolate, acuminate or dorsally rounded, subaristate, entire or minutely 2-toothed below the tip, 3-nerved; III linear, terete, coriaceous, 3-nerved, tapering into a very long rigid recurved awn with two erect sets at its base; IV. a filiform, awn-like, recurved glume, minutely 2-aristate above the middle; palea very narrow, 2-cuspidate, keels scaberulous. Lodicules large, obliquely cuneiform, fleshy. Anthers 3, very slender. Styles distinct, stigmas slender. Grain narrow.

D. Wightii, Nees ex Sleud. Syn. Gram. 145. Gymnopogon rigidus, Thw. Enum. Pl. Zeyl. 372, 444; Trim. Cat. Ceyl. Pl. 109. Aristida linearifolia, Rottl. mss.—Herb. Wight n. 1035.

SOUTHERN INDIA; Tranquebar, Rottler; probably Travancore, Herb. Wight. CEYLON, in dry parts of the island, Thwaites.

Stems, erect, 2-3 ft., tufted on a creeping woody rootstock. Leaves as long as the stem, \(\frac{1}{2}\)-\frac{1}{2} in. broad, quite glabrous, margins smooth; ligule of hairs. Panicle 12-18 in., rachis and few short tranches filiform, quite smooth. Spikelets with the awns 1\(\frac{1}{2}\) in. long, green; gl. I shorter than II, which is about \(\frac{1}{2}\) in. long and about \(\frac{2}{3}\) as long as lII below the short lateral bristles; rachilla below III bearded.—I think Steudel was right in separating this grass from Gymnopogna, all the species of which are American, and from which it differs totally in habit, and in the form of the spikelets, gl. III of which greatly exceeds I and II.

Tribe JX. FESTUCACEE. (See p. 7.)

94. POMMEREULLA, Linn. f.

A short stout perennial creeping grass. Leaves short, strap-shaped. Spikelets 2-3-fld., distichously racemed, narrowly turbinate, villous, not jointed on their pedicels; rachilla stipitiform, narrowly obconic (resembling a callus), villous, jointed at the acute base, crowned by empty deformed fl. gls. Glumes 5-7, I and II narrow, persistent, empty; I lanceolate, 1-nerved; II longer, oblong-lanceolate, 3-5-nerved; III and IV embracing V and VI, empty, flabelliform, 4-lobed, dorsally shortly awned; V-VII flg. euneate-obovate, 3-lobed; pales ovate, acute, nerves 2, pubescent. Lodicules 2, membranous. Stamens 2-3, anthers small. Styles distinct. Grain oblong, compressed, free.

P. Cornucopies, Linn. ftl. Diss. Nov. Gram. 31, & Suppl. 105; Vahl Enum. Pl. ii. 393; Beauv. Agrost. 91, t. 18, f. 6; Roxb. Pl. Corom. ii. 17, t. 131, Fl. Ind. i. 331: Roth. Nov. Sp. 33; Kunth in Ann. Sc. Nat. Ser. I. xxiii. (1831) t. 7, Enum. Pl. i. 321; Steud. Syn. Gram. 249; Trimen Cat. Ceyl. Pl. 109; Wall. Cat. n. 8904; Wight Cat. n. 1769. P. elongatum, Wight & Arn. in Wight Cat. n. 1770. Pennisetum Cornucopies, Heyne ex Wall. l. c.

MYSORE and the CARNATIC, Heyne, Wight. CEYLON; Northern Province, Trimen.

Stem as thick as a crow-quill, rooting at the nodes; branches erect, stout, leafy, flattened. Leaves 1-3 in., distichous, flat, exactly linear, coriaceous, tip rounded, margins sparely ciliate; sheath long or short, broad, flattened; ligule a ciliate ridge. Rareey = 2 in., usually half sunk in the uppermost sheath, rarely with an exserted naked peduncle and sometimes 2 erect branches. Spikelet; for \$\frac{1}{20}\$-\$\frac{1}{2}\$ in., shortly pedicelled, white, tomentose, awns shortly exserted; gls. I and II much shorter than the spikelet, keels nearly smooth, bases narrowed; II inserted much above I, its base tightly embracing the rachilla; III and IV narrowed into a tomentose stipes, embracing V and VI, 4-lobed with a short dorsal awn, disk coriaceous, margins and lobes hyaline; V-VII cuneately obovate, 3-lobed.—A very curious grass. The turbinate spikelets resemble clusters of those of Gracilea, but are not jointed at the base, and their structure is totally different. The above characters are drawn from many analyses, but they will no doubt be found to vary in a more extended snite of specimens.

95. PAPPOPHORUM, Nees.

Perennial grasses. Leaves narrow. Spikelets 1-3-fid., in contracted or spiciform panicles, not jointed at the base; rachilla jointed at the base. Gl. I and II membranous, keeled, 3-many-nerved, persistent; III and IV much shorter (except the awns), coriaceous, orbicular, concave, obscurely many-nerved, cleft into 9 or more equal or alternately longer long-ciliate erect awns; IV and V usually imperfect; palea small, broad, 2-keeled. Lodicules 2, dolabriform. Stamens 3. Sty'es short, distinct; stigmas plumose. Grain ovoid or oblong, free.—Species about 20, in warm regions.

The synonymy of the species of this genus is in a most unsatisfactory condition; I am doubtful of the nomenclature of some here described, and the Indian materials of others, not here alluded to, are insufficient for reliable determination or descriptions.

1. P. elegans, Nees in Wight Cat. n. 1771; gl. I 9-nerved, II 7-nerved, awns of fl. gl. nearly equal about thrice as long as their gl. Wall. Cat. n. 8902; Steud. Syn. Gram. 199; Duthie Grass. N.W Ind. 35. Ischæmum papposum, Herh. Rottler. Enneapogon dipsaceus, Wall. mss. Calotheca elegans, Wight & Arn. ex Steud. l. c.

PESHAWUR, Stewart. Scind, Stocks. Mysore and the Carnatic, Heyne,

Wight, &c. HURMA, Wallich, &c.

Stem 3-18 in., very slender, wiry, erect or ascending from a woody often thickened base; nodes glabrous or tomentose. Leaves very narrow, flat or convolute; ligule a ridge of hairs. Pancle 1-3 in., branches very short and rachis villous. Spikele's with the awns 1-1 in., sesile and pedicelled, softly tomentose, nearly white; gl. I and II oblong-lanceolate, acuminate, I 1 shorter than II; awns of III and IV ciliate below the middle; keels of palea pubescent.

2. P. Aucheri, Jaub. & Spach Ill. Pl. Orient. iv. 32, t. 323; gl. I and II 7-nerved, awas of fig. gls. three to four times as long as the gl. 4 much shorter than the others. Steud. Syn. Gram. 200; Duthie Grass. N.W. Ind. 35. P. turcomanicum, Trautv. in Act. Hort. Petrov. i. (1871) 27. P. persicum, Steud. l.c.; Boiss. Fl. Orient. v. 558; ? Edgew. in Journ. Linn. Soc. vi. (1862) 196; Aitchis. Cat. Panjab. Pl. 106. Enneapogon persicum, Boiss. Diagn. i. V. 71.

WESTERN PANJAB and MODITAN, Aitchison, Stewart, Edgeworth, &c. WESTERN TIBET, alt. 3-7600 ft., Clarke, Duthie, &c.—DISTRIB. Affghan., Persia, Turkestan.

Stem 6-12 in., erect or ascending, slender, puberulous. Leaves 2-8 in., narrow, flat or convolute and filiform; sheaths smooth, or lower tomentose; ligule a pubescent ridge. Paniels 2-5 in., cylindric, silvery-yellow, with sometimes purple awns; rachis pubescent. Spikelets including the awns, \(\frac{1}{2}\) in. Gls. I and II narrowly lancrolate, finely pubescent; II rather the longest; III very short, villous, awns softly silky below the middle, the longer four times as long as the gl and about \(\frac{1}{2}\) longer than the intermediate; palea as in P. elegans.—I am doubtful about the identification of Edgeworth's Mooltan plant, of which the only specimens I have seen are very bad, consisting of tall very slender much branched rigid stems 12-18 in. high, with long very narrow rigid leaves, and a spiciform slender flowerless panicle 6 in. long, together with a spike of very immature spikelets. It is ticketed as from the Shab Kot Hills.

3. ? P. brachystachyum, Jaub. & Spach Ill. Pl. Orient. iv. 34, t. 324; dwarf, tomentose, spike very short, gl. I and II faintly 3-5-nerved below the middle, awns of fl. gl. about twice as long as their gl., 4 shortest. Steud. Syn. Gram. 200; Boiss. Fl. Orient. v. 558. ? P. arabicum, Hochst. ex Steud. l. c. 199; ? Edgew. in Journ. Linn. Soc. vi. (1862) 196; Aitchis. Cat. Panjab Pl. 166; Duthie Grass. N.W. Ind. 35. ? P. nanum, Steud. l. c.; Edgew. l. c.; Aitchis. l. c.; Duthie l. c. P. vincentianum, Schmidt ex Duthie l. c. (in Syn.)

The PANJAB; Multan, Edgeworth. RAJPOOTANA; at Jodhpur, King.—DISTRIB. Arabia, N. Africa.

I am very doubtful about this plant, King's specimens of which resemble a small state of P. Aucheri, with much shorter awas, the four shorter of which are not so short as in the figure cited of P. brachystachyum. Edgeworth's specimens of P. arabicum and P. nanum are insufficient for identification.

4. P. robustum, Hook. f.; stem stout, gls. I and II 3-nerved, awns of III nearly equal, about twice as long as their gls.

UPPER GANGETIC PLAIN; Hissar, Drummond (Herb. Duthie).

Stem 18 in.-3 ft., erect, or geniculately ascending, as thick as a crow-quill, pubescent; nodes tomentose. Leaves 6-10 by \(\frac{1}{2}\)-\(\frac{1}{2}\) in., flat; lower sheaths pubescent; ligule a ridge of hairs. Panicle 2-5 in., silvery-grey, dense-fld., cylindric. Spikelets sessile, \(\frac{1}{2}\) in. with the awns, villous; gl. I \(\frac{1}{2}\) shorter than II, ovate-lanceolate; II lanceolate; III and palea as in P. elegans, but awns shorter, and as in that species with long cilia below the middle.

96. ARUNDO, Linn.

Tall stout perennial grasses. Leaves flat. Spikelets few-fld. in large decompound panicles, laterally compressed, fls. mostly bisexual; rachilla jointed at the base and between the flg. gls., glabrous or shortly hairy. Glumes 6 or more, I and II subequal, empty, narrow, acute or acuminate, glabrous, scarious, persistent, 3-nerved; flg. gls. lanceolate, acuminate, or 2-fid with a short awn, 3-nerved, dorsally hairy all over below the middle; pales hyaline, 2-nerved. Lodicules 2, obovate. Stamens 3. Ovary glabrous, styles distinct, stigmas plumose. Grain oblong.—Species 6 or 7, temp. and trop.

A. Donax, Linn. Sp. Pl. 81; stem creeping below, leaf-base amplexical, panicle erect thyrsiform, spikelets 3-4-fld., gls. I and II oblong-lanceolate 3-nerved, tip of fig. gls. minutely 2-toothed shortly awned.

Host Gram. Austr. iv. 22, t. 38; Kunth Enum. Pl. i. 246, Suppl. 159; Reichb. Ic. Fl. Germ. t. 109; T. Nees Gen. Fl. Germ. Monocot. 1. n. 36; Ledeb. Fl. Ross. iv. 394; Boiss. Fl. Orient. v. 564; Aitchis. Cat. Panjab Pl. 166; Duthie Grass. N. W. Ind. 35, Fodd. Grass. N. Ind. 60. A. bengalensis & bifaria, Retz. Obs. iv. 22, & v. 20; Roxb. Fl. Ind. i. 347, 348; Kunth Enum. Pl. i. 247. A. longifolia, Salisb. Prodr. 24. A. sativa, Lamk. Fl. Fr. iii. 616. A. triflora, Roxb. Ic. Pict. t. 853. Donax arundinaceus, Beauv. Agrost. 78, t. 16, f. 4. D. benghalensis, Beauv. l. c. 78. D. bifarius, Trin. in Spreng. Neue Entdeck. ii. 73. Amphidonax bengalensis, Nees ex Steud. Syn. Gram. 197; Wight Cat. n. 1748. A. bifaria, Nees ex Steud Syn. Gram. 410; Miq. Fl. Ind. Bat. iv. 410. Scolochloa arundinacea, Mert. & Koch Fl. Germ. i. 529. Aira benghalensis, Gmel. Syst. i. 174.—Arundo. Wall. Cat. n. 5018, excl. F., 5020.

LOWER HIMALAYA; from Kashmir to Nepal, ascending to 3500 ft.; and from the PANJAB to SILHET, the NAGA HILLS, alt. 5-8000 ft., and BURMA. The CIRCARS, NILGHIRI, and KURG HILLS.—DISTRIB. Westward to Europe, N. Africa, N. Asia.

Stem 6-10 ft., fistular. Leaves 1-2 ft., tapering from the base to the apex, smooth, bifarious, drooping; ligule a ridge of hairs. Panicls 1-2 ft., branches scaberulous, erect or drooping. Spikelets \(\frac{1}{2}\) in., green or yellowish; gls. I and II acute or obtuse and apiculate.—A curious branched small-leaved apparently dwarf form named A. bambusifolia, mss., was collected by Griffith on the summit of Thumathaya (Mishui Mts.), and is alluded to in his Journals, p. 45, as "an Arundo festucoidea." Grisebach (in Goett. Nachr. (1868) 76) describes a form of A. Pliniana, Turra, with the mouth of the sheath ciliate, as a native of the Himslaya (Simla, alt. 3-9000 ft.). The above character is found in Indian specimens of what I cannot distinguish from A. Donax. A. Pliniana appears to Dr. Stapf and myself to be a mere form of Donax with small r spikelets, which organs in Indian specimens vary from \(\frac{1}{2}\) in. The plants with the smaller spikelets are, I presume, the A. mauritanica, Poir. (a synonym of Pliniana) of Duthie Grass. N. W. Ind. 35, Fodd. Grass. N. Ind. 60.

97. PHRAGMITES, Trin.

Tall perennial grasses. Leaves long. Spikelets 3-7-fid. in decompound panicles, not jointed on the pedicels, laterally subcompressed; rachilla jointed between the fig. gls. and above gl. III, silkily penicillate with very long hairs, not produced beyond the fi. gls. Glumes all glabrous, I and II unequal, oblong-lanceolate, 3-nerved, membranous, persistent; III much longer, narrowly oblong-lanceolate, acute, 3-nerved, male or neuter, persistent; fig. gls. subulate-lanceolate, subaristate, hvaline; palea much shorter. Lodicules 2, obtuse. Stamens 1-3. Styles 2, terminal, free, stigmas plumose. Grain oblong, terete.—Species few, temp. and trop.

1. P. communis, Trin. Fund. Agrost. 134; stem 6-10 ft., and leaves withering in winter, leaf-margins rough, panicle 6-18 in. subsecued, inclined, branches not widely spreading, gl. III \(\frac{1}{2}\frac{3}{2}\) in. Kunth Revis. Gram. i. 277, t. 50; Enum. Pl. i. 251, Suppl. 193; Fl. Dan. t. 2664; Reichb. Ic. Fl. Germ. t. 108; T. Nees Gen. Fl. Germ. Monocot. i. n. 37; Steud. Syn. Gram. 195; Franch. & Sav. Enum. Pl. Japon. ii. 170; Boiss. Fl. Orient. v. 563; Benth. Fl. Austral. vii. 636; Duthic Grass. N. W. Ind. 35, Fodd. Grass. N. Ind. 60. P. chilensis, Steud. Nom. Ed. II. ii. 234. ? P. Emodi, Arn. & Nees in Nov. Act. Nat. Cur. xix., Suppl. i. (1843) 174. P. hispanica, Nees l. c. P. humilis, Not. in Cat. Hort. Genuen. (1846) 27. P. longivalvis, Steud. l. c. 196. P. mauritanica, Kunth Revis. i. 80, 277, t. 50, Enum. i. 251.

P. pumila, Griseb. in Goett. Nachr. (1868) 76 (un Willk.?). P. vulgaris, Trin. Fund. Agrost. 134. Arundo graeca, Link in Linnea, ix. (1834) 136. A. maxima, Forsk. Fl. Eg. Arab. 24. A. Phragmites, Linn. Sp. Pl. 81; Host Gram. Austr. iv. 23, t. 39; Engl. Bot. t. 401; Knapp Gram. Britt. t. 95; Ledeb. Fl. Ross. iv. 393; Aitchis. Cat. Panjab Pl. 266. PA. tecta, Blanc. Fl. Philipp. 48. A. vulgaris, Lamk. Fl. Franc. iii. 615. Czernya arundinacea. Prest Cup. & Grum. Sicil. 22.

KASHMIR LAKE, alt. 5-6000 ft., Jacquemont, &c. GARWHAL, alt. 4-5000 ft., Duthie. WESTERN TIBET. alt. 9-10,000 ft., Thomson, &c .- DISTRIB. N. and S. temp. regions.

Stem erect from a stout creeping rootstock, leafy up to the panicle, fistular. Leaves distichous, linear to broadly lanceolate, tip subulate, base rounded, not amplexicaul; ligule a ridge of short hairs. Panicle usually brownish purple; branches very slender, smooth, hairy; peduncle often silkily hairy at the very base of the panicle, sometimes densely. Spikelets 1-1 in.; gls. spreading in frt. and exposing the long silky hairs of the rachilla, I and II longer than the fig.-Very variable: in dry situations in Tibet and Scind the stems are very short, straggling, with ovate-subulate concave rigid pungent leaves 1-2 in. long, and a reduced panicle. This starved state is the Cenchrus frutescens, Sieb. in Bot. Zeit. ix. (1822) 14. P. pumila, Griseb., is snother reduced condition of P. communis, from Tibet, in which gl. III is as short as in P. Karka. Grisebach in Goett. Nachr. (1868) 76, has also var. isiaca (P. isiaca, Reichb.) as a native of Tibet. I have not seen his specimens, but neither Dr. Stapf nor I can find a valid character for this variety in European specimens.

2. P. Karka, Trin. ex Stend. Nom. Ed. ii. 324; stems very tall stout and leaves perennial, panicle \(\frac{1}{2}\)-2 ft. erect, branches widely spreading, gl. III rarely more than \frac{1}{2} in. P. Roxburghii, Steud. l. c.; Nees in Nov. Act. Nat. Cur. xix., Suppl. i. (1843) 178; Thwaites Enum. Pl. Zeyl. 370; Trim. Cat. Ceyl. Pl. 109; Benth. Fl. Hongk. 428; Duthie Grass. N.W. Ind. i. 35, Fodd. Grass. N. Ind. 60; Franch. & Sav. Enum. Pl. Jop. ii. 170; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 378. P. bifaria, Wight Herb n. 3310. P. nepalensis, Nees ex Steud. Syn. Gram. 196. Arundo Karka, Retz. Obs. iv. 21; Roxb. Fl. Ind. i. 348. A. Roxburghii, Kunth Revis. Gram. i. 79, Enum. Pl. i. 248; Griff. Notul. iii. 47, Ic. Pl. Asiat. t. 139, f. 243. A. Roxburghiana, Kunth ex Steud. Nom. l.c. A. tibialis, Roxb. Ic. Pict. (ined.), t. 854, & in Wall. Cat. n. 5017 G. A. Donax, Herb. Ham. ex Wall. l.c. B. A. Corea, Herb. Rottl. Oxyanthe japonica, Stend. l.c. 197. Sericura japonica, Steud. in Flora, xxix. (1846) 20. Trichoon Karka, Roth. Cutalect. ii. 2.—Arundo, Wall. Cat. n. 5017, 5018 F., 5019.—Arundo. Griff. l. c. 48.

Throughout India: from the Panjab to Burma, and southward to Ceylon, ascending the Himalaya in hot valleys to 3000 ft.—Distres, Affghan., Japan, Trop. Asia. Africa, and Australia.

Except by its greater size, larger more spreading panicle with rather smaller spikelets, more spreading glumes, and shorter gl. III, I can point out no character whereby herbarium specimens of P. Karka can be distinguished from P. communis, and none of those are constant. In both dwarf or very slender states occur with almost filiform leaves and greatly reduced panicles. Dr. Stapf, who has carefully revised my separation of the great pile of Indian specimens into the two species, is equally at a loss to point out any other characters than those given above whereby to distinguish them, except that the rachilla appears to him to be rather longer and more slender in P. Karka and the glumes hence more widely apart; and the glumes also are rather narrower. The perennial duration of the stems and leaves of P. Karka requires verification. These organs are undoubtedly annual in the northern form of

P. communis, and F. Mueller observes (in a letter to Bentham) that they are so in the Tasmanian P. communis; whereas in the tropical Australian plant which Bentham

includes under it they are evergreen.

Var. cincta; spikelets scaberulous, pedicels villous with silky hairs. P. cincta, Clarko mss.—Near Calcutta; Salt Lakes, Kurz; Mutlab, Clarko.—The specimens are in a very young state of flower. The glumes are identical with those of P. Karka, in which latter the pedicels of specimens from all parts of India are quite glabrous.

97*. MEYRAUDIA, Hook, f. (Genus not in clavis).

A tall perennial leafy grass. Leaves long, flat. Spikelets small, 4-8-fld., in an effuse decompound nodding panicle, laterally compressed, lowest fig. gl. sometimes glabrous epaleate and neuter; rachilla shortly bearded below the fig. gls., jointed at the base (above the neuter gl. if present) and between the fig. gls. Glumes all membranous; I and II unequal, empty, lanceolate, 1-nerved; fig. gls. elongate-subulate, more or less recurved, ending in a very slender tip with 2 setaceous points and a scabrid interposed awn, 3-nerved, lateral nerves submarginal, penicillate with long hairs; palea oblong, keels scaberulous. Lodicules 2, obovate or cuneate. Stamens 3, anthers long linear. Ovary shortly stipitate, oblong; styles terminal, stigmas feathery. Grain linear, terete, loose in the gl.

M. madagascariensis, Hook. f.: Arundo madagascariensis, Kunth Revis. Gram. i. 273, t. 48, Enum. i. 247, Suppl. 190; Benth. Fl. Hongk. 427; Duthie Grass. N.W. Ind. 35 (excl. Syn.), Fodd. Grass. N. Ind. 60. A. Reynaudiana, Kunth Revis. l. c. 275, t. 49, Enum. l. c.; Steud. Syn. Gram. 194; Clarke in Journ. Linn. Soc. xxv. (1889) 89. A. Zollingeri, Buese in Mig. Pl. Jungh. 243; Mig. Fl. Ind. Bat. iii. 411. Phragmites Zollingeri, Steud. in Zoll. Cat. 55; Syn. Gram. 196. Donax Thouarii, Beauv. Agrost. 78, t. 16, f. 5.—Arundinacea, Griff. Notul. iii. 49, n. 6; Ic. Pl. Asiat. t. 156, f. II.—Arundo, Wall. Cat. n. 5021, 5022.

The PANJAB and TROPICAL HIMALAYA, from Chamba to Sikkim, ascending to 5000 ft. SILHET and the KHASIA HILLS, ASSAM. PENANG and BURMA.—DISTRIB

Tropical E. Asia and Malaya. Trop. Africa, Madagascar.

Stem 6-8 ft. (or more?) up to \(\frac{1}{2}\) in. diam., lenfy to the panicle or near it, polished, solid, glaucous at the nodes. Leaves 1-2 ft., from filiform and convolute to 1 in. broad and flat, smooth, rather soft, margins smooth or nearly so, midrib and few nerves slender, base subamplexicaul; sheaths polished; ligule a villous ridge. Pawicle 1-3 ft., rachis and filiform fascicled and whorled branches smooth or subscaberulous, ultimate branchlets capillary. Spikelets \(\frac{1}{2}\)-\frac{1}{2}\) in. (including the awns), shortly pedicelled, pale brown, 4-8 fld.; gl. I and II shining, I \(\frac{1}{2}\) shorter than II; neuter gl. if present \(\frac{1}{2}\)-\frac{1}{2}\) in., about twice as long as I, strict, spreading, oblong-lanceolate, suberect, 3-nerved, sides convolute, quite glabrous; flg. gls. longer than the empty, more or less recurved, very slender, narrowed into the more or less recurved not twisted scaberulous awn with two bristles at its base; palea hyaline, 2-toothed, keels minutely ciliolate; callus, the upper portion of each internode of the rachilla, jointed with the latter, densely shortly beared.—A much more elegant grass than any Indian species of Arundo or Phragmites, but like these extremely variable in habit and size, depending on place of growth. I can find no difference whatsoever between the specimens with and those without the empty gl. III; specimens with filiform leaves occur in both. Their habitats are as follows:—

 madagascariensie proper; neuter gl. 0. Western Himalaya; from Kashmir to Kumaon, Rangoon, Prome.—Africa, Madagascar.

2. Zollingeri; neuter gl. present. Arundo Reynaudiana, Kuath l.c.—Sikkim Himalaya, Assam, Bengal, the Khasia Hills, Chittagong, Tenasserim, Penang.—

Java.

98. FINGERHUTHIA. Lehm.

Erect, rigid, annual or perennial grasses, with the habit of *Phleum*. Leaves narrow. Spikelets crowded in a spiciform panicle, 1-3-fid, lowest in the panicle reduced to subulate glumes, laterally compressed, jointed on the very short pedicels; lower fi. bisexual or male, upper if present male, uppermost an empty gl. Glumes I and II subequal, rigidly membranous, keeled, 1-nerved, awned; III as long as II, oblong-lanceolate, obtuse, 5-nerved, mucronate or dorsally shortly awned; palea rigid, 2-keeled. Lodicules 2, obcordate. Anthers 3, linear-oblong. Styles long, free, stigmas plumose. Grain elliptic or oblong, free.—Species 2, a S. African, and the following.

A genus of doubtful affinity, with certain characters of Alopecurus, and of Melica in the spikelets jointed on their pedicels; the imperfect basal spikelets form a sort of involucre to the spiciform panicles as in Sesteria.

F. affghanica, Boiss. Fl. Orient. v. 569; spikelets 3-fld., lowest fl. fem., intermediate male, upper neuter, gls. I and II shortly awned keels and margins ciliate. F. africana, Aitchis. in Journ. Linn. Soc. xix. (1882) 193 (non Lehm.).

WESTERN PANJAB; Peshawur, alt. 8500 ft., Stewart.—DISTRIB. Afighan. Stem 12-18 in., tufted, slender, leafy. Leanes very narrow, flat, glaucous, glabrous, smooth; sheath glabrous, mouth bearded; liquide a ridge of soft hairs. Spike 1-1 in., oblong, obtuse, long-peduncled, pale green. Spiketis in., closely imbricate; gls. I and II lanceolate, narrowed into straight awns as long as themselves, keels and margins ciliate with long hairs; III chartaceous, mucronate, keel smooth, margins ciliate; keels of palea ciliate; IV hardly awned; V an empty gl. Grain elliptic-oblong, acute at both ends.—The only Indian specimen is a very poor one.

99. ELYTROPHORUS, Beauv.

An annual erect grass. Leaves narrow, flat. Spikelets very minute, 3-5-fld., in globose sessile clusters that are densely packed along a simple rachis forming a long cylindric often lobed or interrupted spike; each cluster consists of very many densely crowded sessile compressed spikelets with awned glumes subtended by many empty glumes, not jointed at the base; rachilla smooth, jointed at the base and between the fig. gls. Glumes (of perfect spikelets), I and II subequal, empty, membranous, mucronate, keeled, 1-nerved, persistent; fig. gls. rather larger, narrowed into short awns, 3-nerved, uppermost empty; palea complicate, one or both keels winged. Lodicules 2, obliquely oblong. Anthers 1-3, minute. Styles free, stigmas long hairy. Grain obliquely oblong, beaked, free.

21. articulatus, Beauv. Agrost. 67, t. 14, f 2; Kunth Revis. Gram. ii. 481, t. 154, Enum. Pl. i. 391, Suppl. 325; Thw. Enum. Pl. Zeyl. 374; Trim. Cat. Ceyl. Pl. 189; Aitchis. Cat. Panjab Pl. 171; Wall. Cat. n. 3825; Duthie Grass. N. W. Ind. 36, Fodd. Grass. N. Ind. 61, t. 72; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 379; Miguel Fl. Ind. Bat. iii. 400; Benth. Fl. Austral. vii. 638. Echinalysium articulatum & strictum, Trin. Fund. Agrost. 142. Ductylis spicata, Willd. in Ges. Naturf. N. Schrift. iii. (1801) 416. Seeleria spicata, Spreng. Pugill. ii. 21. Eleusine calycina, Herb. Ham. ex Wall. l. c.

From the SUTLES to BENGAL, ASSAM, the DECCAN PENINSULA, BURMA, and

CEYLON. - DISTRIB. Trop. Asia, Africa, and Australia.

Whole plant 6-18 in. high, strict, glabrous; flowering part often longer than the rest. Leaves as long as the stem and spikes or shorter, very marrow; sheath loose; ligule obscure. Spiciform panicle 2-8 in. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in. diam., pale green or white, rarely branched below. Spikelets \(\frac{1}{2}\) in., empty gls. ciliate, hyaline, nerve green; fig. gls. ovate, membranous, tips and awns scabernlous; pales hyaline, 2-fid.

100. LAMARKIA, Moench.

A small annual tufted grass. Leaves flat. Spikelets dimorphic, fertile and neuter, crowded on the drooping branches of a simple secund nodding panicle, terminal spikelet of each branchlet fertile of few gls. surrounded by empty gls., and by neuter spikelets of many obovate convolute erose gls. Fertile spikelet; glumes IV, I and II membranous, subequal, subulatelanceolate, 1-nerved, subaristate, persistent; III shorter, ovate, convolute, dorsally awned below the 2-fid tip; IV terminating the slender rachilla, neuter, long-awned; palea of III narrow, 2-fid, 2-keeled. Lodicules very minute. Stamens 3, authers linear. Styles distinct, stigmas slender, hairy. Grain elliptic-oblong, closely wrapped in the gls. and palea.

L. aurea, Moench Meth. 201; Kunth Enum. Pl. i. 389, Suppl. 324; T. Nees Gen. Fl. Germ. Monoc. i. n. 77; Boiss. Fl. Orient. v. 570; Ai'chis. Cat. Panjab Pl. 170; Duthie Grass. N.W. Ind. 36, Fodd. Grass. N. Ind. 61. L. Hookeriana, Griff. Notul. iii. 94, Ic. Pl. Asiat. t. 143, f. 2. Chrysurus aureus. Beauv. Agrost. 123, t. 22, f. 5; Reichb. Ic. Fl. Germ. t. 58. C. cynosuroides, Pers. Syn. i. 80. Pterium elegans, Desv. Journ. Bot. i. (1813) 76. Tinwa elegans, Garzia Rel. Acc. Zel. Aci. Rea'e, Ann. 3-4, 24, ex Parlat. Fl. Palerm. i. 138. Cynosurus aureus, Linn. Sp. Pl. 73; Host Gram. Austr. iii. t. 4; Sibth. Fl. Graec. i. t. 79.—Gramin. Griff. Itin. Notes, 349, n. 106.

WESTERN PANJAB; Peshawar, Vicary, Stewart, Aitchison.—Distrib. Westwd. to Spain and the Canaries.

Stem 4-8 in., stout or slender, leafy. Leaves broadly linear, acuminate; ligule oblong. Panicle 1-4 in., golden-yellow, shining; branches crowded, \(\frac{1}{2}-\frac{1}{2}\) in. long, covered with fuscicles of pendulous scaberulous spikelets. Flowering spikelets \(\frac{1}{2}-\frac{1}{2}\) in.; awns variable in length, \(\frac{1}{2}-\frac{1}{4}\) in.—A very beautiful grass.

101. CYNOSURUS, Linn.

Annual or perennial tusted grasses. Leaves flat. Spikelets dimorphic, fascicled, fascicles collected in a dense unilateral spiciform terminal panicle, the 1-2 terminal of each fascicle 2-3-fld, the lower 1-2 of many neuter distictions pectinately spreading subulte glumes, persistent on an unjointed rachilla. Glumes of fertile spikelet 4-5; I and II narrow, acute or subaristate, 1-nerved; III and IV awned or mucronate, 1-3-nerved, uppermost imperfect; palea narrow, 2-toothed, keels ciliate. Lodicules 2, acuminate. Stamens 3. Styles short, free. Grain elliptic or oblong, glabrous, adherent to the gl. and palea.—Species 3-4, in N. temp. regions.

C. cristatus, Linn. Sp. Pl. 72; perennial, fertile spikelets 3-5-fid. Fl. Dan. t. 238; Host Gram. Austr. ii. t. 96; Kunth Enum. Pl. i. 388,

Suppl. 323; Engl. Bot. t. 316; Knapp Gram. Britt. t. 64; Reichb. Ic. Fl. Germ. t. 7; T. Nees Fl. Germ. Monocot. i. n. 96; Beauv. Agrost. 66; Steud. Syn. Gram. 299; Ledeb. Fl. Ross. iv. 348; Boiss. Fl. Orient. v. 570: Duthie Grass, N.W. Ind. 36.

WESTERN HIMALAYA; Drankar, in Piti, att. 12-14,000 ft., Stoliska (introd.?)

-DISTRIB. Europe, As. Min. (introd. elsewhere).

Perennial. Stem 1-2 ft., slender, simple, wiry, strict, stoloniferous, naked above. Leaves very narrow, slightly hairy; ligule 2-fid. Paniels 1-3 in., semicylindric, strict, rigid, oblong or linear; rachis flexuous. Spikelets about $\gamma_{\bar{s}}$ in., the outer pectinately arranged, forming an involucre to each fuscicle; fig. glumes I and II oblong, scabrid above, very shortly awned; neuter gls. rigid, cuspidate, concave, scabrid, pungent.—I have seen no Indian specimen of this common European grass. According to Boissier its Eastern limit is the Caucasus.

102. ROELERIA, Pers.

Annual or perennial tufted grasses. Leaves narrow. Spikelets 2-7-fld. (uppermost flg. sterile), densely crowded in subspiciform panicles, strongly laterally compressed, very shortly pedicelled; rachilla jointed between the fl. gls., and produced beyond the upper. Glumes I and II unequal, empty, persistent, keeled, acute or acuminate; fll. gls. broadly scarious, 3-5-nerved, mucronate acuminate or bifid and shortly awned in the sinus; awn straight scabrid; palea hyaline, 2-toothed. Lodicules 2. Stamens 3. Stigmas subsessile, plumose. Grain oblong, laterally compressed, free.—Species about 12, of N. temp. regions.

Sect. I. AIROCHLOM, Link. (Gen.). Perennial. Flg. glumes entire, not awned.

1. **E.** cristata, Pers. Syn. i. 97; leaves short, panicle shining, spikelets 2-4-fid. I 1-nerved, II longest, 1-3 nerved; fig. gls. acute or mucronate. Fl. Dan. t. 2223; Kunth Enum. Pl. i. 381, Suppl. 315; Reichb. Ic. Fl. Germ. t. 93; T. Nees Gen. Fl. Germ. Monocot. i. n. 64; Steud. Syn. Gram. 292; Duthie Grass. N.W. Ind. 36, Fodd. Grass. N. Ind. 61; Aitchis. Cat. Panjab Pl. 170; Ledeb. Fl. Ross. iv. 402; Boiss. Fl. Orient. v. 571; Benth. Fl. Austral. vii. 639. K. glauca, DC. Cat. Hort. Monsp. p. 117; Ledeb. l. c. K. gracilis, Pers. l.c. K. Linkii, Kunth l.c. K. lobata, Roem. & Sch. Syst. ii. 620, K. nitida, Nutt. Gen. Am. i. 74. K. valesiaca, Gaud. in Alpina iii. 47, Agrost. i. 149. Aira cristata, Linn. Sp. Pl. 63; Engl. Bot. t. 648; Knapp Gram. Britt. t. 30. A. glauca, Spreng. Nachtr. Bot. Gart. Halle, i. 10; Fl. Dan. t. 1566; Kunth l. c. i. 381. Airochloa cristata, valesiaca, pubescens, & gracilis, Link Ehum. Hort. Berol. i. 127, 128, ii. 228. Dactylis cristata & lobatu, Bieb. Fl. Taur. Cauc. i. 67. D. paleacea, Linn. Herb. ex Munro in Journ. Linn. Soc. vi. (1862) 44. Poa cristata, Withering Arr. Brit. Pl. 145; Host Gram. Austr. ii. 54, t. 75. P. nitida & pyramidata, Lamk. Illustr. i. 182, 183. Festuca cristata, Vill. Hist. Pl. Dauph. ii. 93. F. dactyloides. & F. glaucescens, Roth. Nov. Sp. 78.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET; from Kashmir to

Nepal, alt. 5-13,000 ft.—DISTRIB. N. temp regions.

Densely tufted, stoloniferous. Stem 1-3 ft., slender, glabrous or pubescent. Leaves narrow, flat or involute, glabrous or the lower ciliate; old sheaths not lacerate; ligule obscure. Panicle 1-4 in., linear-oblong or lanceolate; branches very short, scabrid; peduncle glabrous or tomentose. Spikelets \(\frac{1}{2-1}\) in., shining, green,

purplish, or silvery with a green keel; gls. I and II acute, broadly hyaline, glabrous pubescent or scabrid, keel subscaberulous, rachilla scabrid; fig. gls. lanceolate, acute or submucronate.—The synonymy given above includes but a few of the names given to this variable grass, the determination of the species of which would involve great labour. In India there are two prevalent forms, both common European ones, which following Boissier may be thus defined.

Var. tenuifolia, Boiss. Fl. Orient. v. 575; stems 6-10 in., leaves very short narrow convolute, panicle 1-3 in., spikelets 1 in. green or purplish. K. brevis, Stev. in Bull. Soc. Nat. Mosc. xxx. (1857) II 110.—Koeleria, Wall. Cat. n. 3792.—Subalpine and alpine situations, alt. 9-13,000 ft.

Var. grandiflora, Boiss. l. c.; leaves longer broader flat, panicles 3-5 in. white often interrupted or branched below, spikelets in. K. glauca, Ledeb. Fl. Ross. iv. 402. K. grandiflora, Bertol. ew Sohult. Mant. ii. 345.—Temp. regions, alt.

5500-11,000 ft.

Sect. II. LOPHOCOLEA, Reichb. (Gen.). Annual. Flg. glumes 2-fid, awned.

2. **E. phieoides.** Pers. Syn. i. 97; leaves soft flat glabrous or hairy on the margins and towards the base, panicle cylindric pale or dull green lobulate or not, spikelets 3-7-fld., gl. I and II unequal acute or aristately acuminate glabrous pubescent or hirsute, fig. gls. 2-fid awned in the sinus, awn 1-1 as long as the gl. rarely longer. Kunth Enum. Pl. i. 383, Suppl. 317, t. 28, f. 1; Steud. Syn. Gram. 294; Ledeb. Fl. Ross. iv. 403; Boiss. Fl. Orient. v. 572; Duthie Grass. N.W. Ind. 36, Fodd. Grass. N. Ind. 61; Aitchis, Cat. Panjab. Pl. 170; Benth. Fl. Austral. vii. 639. K. berythea, Boiss. & Bl. Diagn. Ser. II. iv. 135. K. brachystachya, DC. Cat. Hort. Monsp. 120. K. cristata, Bertol. Amoen. Ital. 67. K. dactyloides, Spreng. Syst. 332. K. Figarei, de Notar. in Ann. Sc. Nat. Ser. III. iz. (1848) 325. K. obtusiflora, Boiss. L. c. I. vii. 131. K. trapezuntina, C. Koch in Linnæa, xxi. (1848) 396. Festuca cristata, Linn. Sp. Pl. 76. F. phleoides, Vill. Fl. Delph. 7, Hist. Pl. Delph. ii. 95, t. 2; Host Gram. Austr. iii. t. 21. Lophochloa phleoides, Reichb. Fl. Germ. Excurs. 42. Ic. Fl. Germ. 73; T. Nees Gen. Fl. Germ. Monocot. i. n. 63. Wilhelmsia caucasica, C. Koch in Linnæa, xxi. (1848) 400. Dactylis caudata, & cylindracea, Brot. Fl. Lusit. i. 99, 100. D. pungens, Hornem. Enum. Hort. Hafn. ex Kunth (1804) 9. D. spicata, Brot. ex Spreng. Syst. i. 332. Trisetum phleoides, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 65. Poa phleoides, Lamk. Illustr. i. 182. Bromus alopecuroides, Lagasc. Gen. & Sp. Nov. 4. B. dactyloides, Roth Nov. Sp. 60. Rostraria pubescens, Trin. Fund. Agrost. 149.

PLAINS of the PANJAB, from Lahore westwards. The SALT BANGE, &c. : KASHMIB, Clarke.—Distrib. Westwo. to the Atlantic. (Australia, introd.)

Stems 6-12 in., erect or ascending. Leaves as long or shorter, erect, acuminate; sheaths smooth; ligule short, truncate. Panicle \$\frac{1}{2}-3\$ in., by \$\frac{1}{2}-\frac{1}{2}\$ in. diam., sometimes lobed or branched at the base. Spikelets \$\frac{1}{2}-\frac{1}{2}\$ in., hardy shining, gls. I and II unequal, shorter than the fig., keels scabrid or smooth; I oblong-lanceolate, 1-nerved; II longer, oblong, acuminate, 3-nerved; fig. gls. elliptic-oblong, 5-nerved, at length tubercled, awn short or long, rachills hairy. —A variable plant in the glumes, of which Boissier has 4 varieties. As with K. cristata, I have confined the synonyms of K. phleoides to those I am pretty sure of. Probably a dozen others might be cited.

3. E. argentea, Griseb. in Goett. Nachr. (1868) 77; leaves flat glabrous, panicle interrupted elongate, spikelets 2-3-fld. silvery white

glabrous shining, tip of gl. I 2-toothed, awn of fig. gl. very short dorsal above the middle of the gl.

WESTERN TIBET, and Kishtwar, alt. 10-13,000 ft., Falconer, Thomson, &c.

Stem 12-18 in., tufted, tomentose below the panicle. Leaves 3-5 in., very narrow, glabrous, flat or convolute; ligule short, lacerate. Panicle 11-31 in., rachis tomentose. Spikelets 1 in., shining, gls. I and II subequal or I rather the shortest, both 1-nerved; rachilla laxly villous; awn of fig. gls. a little exceeding the gl. itself.

103. CATABROSA, Beauv. (by O. Stapf).

Perennial soft grasses; stem erect or creeping below; innovations extra-vaginal. Leaves flat. Spikelets very small, 2- (rarely 3-4)- fld., loosely panicled, oblong or obcome, awuless, subarticulate on their pedicels; rachilla jointed at the base, produced beyond the flg. gl. Glumes 4 or more, uppermost usually imperfect; I and II very unequal, hyaline, empty, persistent, 0-3-nerved; I obtuse or truncate; II broadly obcuneate or orbicular; III and IV longer than II, broadly cuneate or flabelliform, 3-5-nerved, truncate, crenate; palen as long as the gl., very broad, keels smooth, glabrous or hairy. Lodicules 2, minute, fleshy. Stamens 3. Stigmas subsessile, feathery. Grain obovate or oblong, free, glabrous.— Species 10-12, natives of cold or temperate regions.

Under Phippsia (p. 240), I indicated the affinity of that genus with Colpodium, and a further examination of the Indian plants referred to the latter, suggested to me the possibility of these, together with Dupontia, forming one genus. I accordingly drew Dr. Stapf's attention to the group, and requested him to give me his opinion. This he has done, confirming my hypothesis and drawing up a systematic account of the Indian species to be included under Catabrosa. As to Phippsia algida, the solitary arctic type of that genus, it differs from the other plants of the Colpodium group in the empty gls. being minute or obsolete, and may hence be considered as forming a section by itself, whilst P. himalaica, with larger empty gls., enters that of Colpodium. The position of Catabrosa is after Poa, replacing 119. Colpodium in the Key to the Genera.

- § 1. CATABROSA proper. Empty gls. almost nerveless; flg. gls. strongly 3-nerved, rarely with 2 intermediate fainter nerves.—Aquatic or subaquatic plants, rooting at the lower nodes, and with usually long creeping or ascending branched stolons.
- 1. C. aquatica, Beaur. Agrost. 97, t. 19, f. 8; stem compressed, leaves linear obtuse, panicle oblong or pyramidal, lower branches at length deflexed, spikelets 2 rarely 3-fld., gl. III erose, nerves subpercurrent. Kunth Enum. Pl. i. 369, Suppl. 306, t. 25, f. 1; Ledeb. Fl. Ross. iv. 387; T. Nees Gen. Fl. Germ. Monoc. i. n. 58; Bviss. Fl. Orient. v. 576. PC. frigida, Phil. Fl. Atac. 55. C. ochroleuca, Guss. Fl. Sic. Syn. i. 100; Dumort. Obs. Gram. Belg. 108. Aira aquatica, Lini. Sp. Pl. 64; Fl. Dan. t. 381; Host Gram. Austr. ii. t. 41; Engl. Bot. t. 1557; Knapp. Gram. Britt. t. 29. Colpodium aquaticum, Trin. Fund. Agrost. 136. Glyceria airoides, Reichb. in Moessl. Handb. Ed. II. iii. 1827, Ic. Fl. Germ. t. 78. G. aquatica, J. & C. Presl. Fl. Cech. 25 (non Wahlb.); Steud. Syn. Gram. 286. Molinia aquatica, Wibel Prim. Fl. Werth. 116. Poa airoides, Koel Descr. Gram. 194.

BRITISH BELUCHISTAN; Questa (Duthie) .- DISTRIB. N. Temp. and Arctic regions.

Stem 6-24 in., erect from the creeping sometimes floating base, sheathed nearly up to the panicle; stolons creeping or ascending, branches long or short. Leaves 1-6 by \(\frac{1}{2} \) in., linear, obtuse, flat, subflaccid, smooth; sheaths tight, smooth, of young branches closed to near the mouth but easily split to the base; ligule ovate or truncate, hyaline. Panicle up to 8 in., open, loose, rachis smooth, lower branches 5-10-nate, slender, very unequal, subscaberulous, the longer 4 in., branching; lateral pedicels very short. Spikelets pale green or yellowish, rarely purple; rachilla smooth; gls. very thin broad and obtuse; I about \(\frac{1}{2} \) in., nerveless or 1-nerved; II \(\frac{1}{2} \) in., 1-sub-3-nerved; fl. gls. nearly \(\frac{1}{10} \) in., obvoate to broadly oblong, truncate, shortly hairy below; palea broad, very obtuse, keels hairy below. Lodicules obliquely ovate. Asthers \(\frac{1}{10} \) in. Grain \(\frac{1}{10} \) in., oblong, subacute at both ends or top rounded, laterally subcompressed, hilum punctiform.—I have seen no Indian specimens, but am informed by Mr. Duthie that his was named by Hackel.

Var. augusta, Stapf; dwarf, tufted, with or without stolons, panicle narrow contracted, branches very short, gls. I and II nerveless or nearly so, fig. gls. 1 in C. aquation, Duthis Grass. N.W. Ind. 36.—Western Tibet; Lanak Pass,

alt. 15-16,000 ft., Thomson.

2. **C. sikkimensis**, Stapf; stem short, stolons long, leaves $\frac{1}{2}$ -1 in., panicle $\frac{1}{2}$ in. narrow loose, branches 2-nate subsimple, spikelets $\frac{1}{10}$ in. 2-fid., gl. I minute, fig. gls. 5-nerved, nerves ending below the hyaliue margin, lateral rather strong.

ALPINE SIKKIM: alt. 17.000 ft., Gammie.

Stem up to 6 in., prostrate or ascending; stolons with short fascicles of few short complicate leaves. Spikelets dark purple, variegated with yellow; gl. I up to $\frac{1}{20}$ in. nerveless, broadly ovate to oblong, I1 up to $\frac{1}{20}$ in., broader, sub-1-nerved; fig. gls. $\frac{1}{15}$ in., truncate, erose, glabrous; palea broad, very obtuse, keels smooth.—The specimens are very scanty, and have all the appearance of being reduced forms, growing on wet soil on the upper limits of vegetation. Specimens from a lower altitude may require modification of the above characters.

- § 2. COLPODIUM, Trin. (Gen.). Empty gls. 1-3-nerved; fig. gls. 5-3-nerved, nerves faint, lateral short, intermediate often suppressed or represented by a single spiral vessel.
 - Empty gls. about half as long as the flg.
- 3. C. himalaica, Stapf; paniele erect spiciform dense-fid., spikelets 10 in. 1-2-fid. Colpodium subspicatum, Hack. mss. Phippsia himalaica, Hook. f. ante, p. 240. Vilfa, sp. 2, Horb. Strackey & Winterb.

. From Kashmir to Kumaon, alt. 18-14,500 ft.

Stems 3-8 in., tufted, erect, smooth, nodes 1-2. Leaves complicate or the cauline flat; sheaths tight, closed almost to the mouth; ligule very short. Panicle continuous or interrupted; rachis and branches smooth. Spikelets obvoid to oblong, rachilla glabrous; gls. very thin, nerves obscure; I very shortly 1-nerved; II with short obscure side-nerves; III with very short obscure side-nerves, keel and nerves shortly hairy; keels of palea ciliate. Lodicules connate at the base. Grain ellipticoblong, compressed.—For further description see p. 240. Duthie's n. 12,160 has more acute empty glumes with sometimes erose margins, but does not otherwise differ.

4. **C. Thomsoni,** Hook. f; panicle erect open lax-fld., spikelets $\frac{1}{2} - \frac{1}{2}$ in 2-4-fld.

WESTERN TIBET; Nubra Valley, alt. 10-11,000 ft., Thomson.

Stems 4-8 in., tuited, very alouder, erect, smooth, nodes 3-5. Leaves \(\frac{1}{2}\)-1\(\frac{1}{2}\) in., linear, acute, flat, few-nerved; sheaths closed to \(\frac{1}{10}\)-\(\frac{1}{2}\) in. of the mouth, thin, tight;

ligule broadly ovate, rounded. Panicle 1 in., ovate, erect; rachis smooth; branches spreading or deflexed, filiform, with few spikelets; lateral pedicels very short. Spikelets oblong, pale green; rachilla smooth, tip setiform; gls. thin, obtuse, I 1-nerved; II longer with 2 short lateral nerves; III 5-nerved, lateral nerves very faint and keel hairy; palea 2-fid, keels with long hairs. Anthers oblong. Lodicules connate near the base. Grain obliquely oblong, compressed.

5. **C. nutans**, Stapf; panicle open or contracted flaccid, spikelets $\frac{1}{4-\frac{1}{3}}$ in. 2-5-fld. Colpodium nutans, Griseb. in Goett. Nachr. (1868) 76. Graphaphorum nutans, Munro ex Duthie Grass. N.W. Ind. 41.

ALPINE HIMALAYA; from Kashmir to Garwhal, alt. 10-14,000 ft., Jacquemont, &c.

Stems 12-18 in., tufted, erect, smooth, nodes 2-3. Leaves very variable in length and breadth, up to 6 in. by \$\frac{1}{2}\$ in., flat flaccid, many-nerved; sheaths of innovations closed nearly to the mouth; ligule \$\frac{1}{2}\$ in. Panicle 2-5 in., nodding or flexuous; rachis smooth; branches subcapillary, lowest 2-3-nate, sparingly divided beyond the middle; lateral pedicels half as long or as long as the spikelets. Spikelets broadly obovate, variegated, rachilla glabrous; gls. very broad, thin, obtuse and erose; II-3-nerved, II longer, \$\frac{1}{2}\$ in., with 2 short lateral nerves; III obovate, 3-5-nerved, lateral nerves very short, all hairy; keels of palea hairy. Lodicules lanceolate, connate near the base. Anthers linear. Grain oblong, subterete, with a shallow ventral groove.

- ** Empty gls. as long as the fig. or longer. Dupontia, Br. (Gen.).
- 6. **C. Wallichii,** Hook. f.; panicle subracemose few-fid., spikelets $\frac{1}{10} \frac{1}{8}$ in. 1-2-fid.—Gramin., Wall. Cat. n. 8907.

NEPAL, Wallich. SIRKIM; Kunkola Pass, alt. 14-15,000 ft., J. D. H.

Stem 6-18 in., from a shortly creeping base, slender or rather stout, smooth, nodes 1-2. Leaves 1-3 in., narrowly linear or filiform; liqule $\frac{1}{10}$ in. oblong, obtuse. Panicle 1-2 in., very narrow, usually reduced to a few-fid. raceme, erect; rachis smooth; branches with 1-3 spikelets, capillary, flexuous. Spikelets pendulous, green or purplish; rachilla with a setiform tip; gls. very thin, obtuse; I oblong 1-3-nerved; II broader, more obtuse, 3-nerves, side-nerves reaching about the middle; III broadly elliptic-oblong, 5-nerved, inner side-nerved very faint, glabrous or nearly so, outer and keel shortly hairy, keels of palea ciliate. Lodicules lanceolute, connate to the middle or below it. Anthers linear-oblong. Grain oblong, compressed.—The Sikkim specimens have somewhat smaller and paler spikelets thun the Nepalese.

104. ERAGROSTIS, Beauv. (by O. Stapf.)

Annual or perennial grasses. Stem erect or geniculately ascending, very rarely prostrate. Leaves narrow. Spikelets many- (rarely 1-2-) fld., in open or contracted panicles, rarely in simple spiker, not articulate at the base (except E. cynosuroides), usually strongly laterally compressed; rachilla firm or subarticulate between the fig. glumes, not produced beyond the uppermost gl. Glumes many, broad, obtuse acute or mucronate, never awned, dorsally rounded and keeled; I and II much shorter than the spikelet, equal or unequal, empty, persistent or separately deciduous, 1-nerved or II 3-nerved; fig. glumes imbricating, at length deciduous from the rachilla, 3-nerved, all bisexual or the uppermost and rarely the lowest imperfect; palea broad, membranous, deciduous with its gl. or persistent ou the rachilla, keels 2 ciliate scabrid or smooth. Lodicules 2, very minute. Stamens 2 or 3. Ovary glabrous; styles 2, stigmas

plumose. Grain minute, globose oblong ovoid or obovoid, free in the gl. and palea.—Species about 100, of warm countries.

The Asiatic and African species of this very difficult genus have been studied by Dr. Stapf, to whom I owe the classification and diagnoses of the Indian. With regard to their synonymy, and the citation of authorities, we have together endeavoured to determine these; but from the want of authentically named specimens of the species described by Roxburgh (under Poa) and by older authors, and of those enumerated in more recent works, we cannot hope to have attained complete accuracy in these respects.—J. D. H.

- A. Spikelets panicled; panicle open contracted or spiciform.—Species 1-25.
- Sect. I. CATACLASTOS. Rachilla of spikelets more or less jointed, and breaking up from above downwards.—Species 1-7.
- * Panicle spiciform, rachis bearded at the nodes; margins of flg. glumes ciliate.
- 1. **21.** phleoides, Stapf; perennial, panicle compact subclavate, spikeletu $\frac{1}{8} \frac{1}{4}$ by $\frac{1}{12} \frac{1}{8}$ in. 12- or fewer fid., fig. gls. mucronate, keels of palea long-ciliate. Dactylis phleoides, Klein ex Steud. Nom. Ed. II. i. 478. D. phleoides & spicata, Herb. Heyne ex Wall. Cat. n. 5015.— Eragrostoides, Wall. l. c.

SOUTHERN INDIA, Heync.

Stems 1-3 ft., densely tufted, erect or geniculately ascending, very slender. Leaves 3-5 in., linear-lanceolate, finely acuminate, spreading, flat, glabrous, base rounded; sheath bearded close below the mouth; ligule a few hairs. Panicle 1-3 in. by $\frac{1}{3}$ - $\frac{3}{8}$ in. diam., pale, rather shining; branches very short, villous at the nodes. Spikelets moderately compressed; gls. I and II subequal, acute; flg. gls. $\frac{1}{10}$ - $\frac{1}{8}$ in., membranous, minutely scaberulous; nerves slender, prominent; palea $\frac{1}{8}$ shorter than its gl. Anthers $\frac{1}{60}$ in. Grain $\frac{1}{100}$ - $\frac{1}{60}$ in., elongate-ellipsoid.

2. E. ciliata, Nees Agrost. Bras. 512; perennial, panicle cylindric compact, spikelets $\frac{1}{10} - \frac{1}{6}$ in. or smaller much compressed 6-12-fld., flg. gls. cuspidately acuminate, keels of palea long-ciliate. Wight Cat. n. 1788; Steud. Syn. Gram. 265; Dalz. & Gibs. Bomb. Fl. 298. E. rupestris, Steud. l. c. Poa ciliata, Roxb. Fl. Ind. i. 334. P. cylindrica, Herb. Heyne & incurvata, Rottl. ex Wall. Cat. n. 5014. P. duplo-ciliaris, Roxb. Ic. Pict. ined. t. 831. P. rupestris, Roth. Nov. Pl. Sp. 71.—Eragrostid. Wall. l. c.

BOMBAY; at Domus, Dalz. & Gibs. CHOTA NAGPORE, Clarke. SOUTHERN

INDIA, Heyne. - DISTRIB. Cochin China.

Stems 2-4 ft., erect or geniculately ascending from a nodose base clothed with hard sheaths, smooth. Leaves linear-lanceolate, finely acuminate, widely spreading, flat or convolute, rarely $\frac{1}{4}$ in. broad, smooth, glabrous; sheath bearded close below the mouth; ligule a few hairs. Panicle 2-3 by $\frac{1}{4}$ in. dium.; branchlets hirsute. Gls. I and II acute, ciliate; flg. gls. $\frac{1}{16} - \frac{1}{6}$ in., membranous or subhyaline, minutely scaberulous, nerves prominent; palen $\frac{1}{4}$ shorter than its gl. Anthers about $\frac{1}{18} - \frac{1}{16}$ in. Grain ovoid to ellipsoid, $\frac{1}{80}$ in., terete.—I have not seen Bombay specimens.

3. **E. coarctata**, Stapf.; perennial, panicle elongate subspiciform often lobed or lax-fid., spikelets $\frac{1}{12-6}$ by $\frac{1}{12}$ in., slightly compressed 5-10-fid., fig. gls. obtuse, keels of palea long-ciliate. E. cylindrica, Aitch. Cat. Punjab Pl. 169 (non Steud.).—Eragrostis, Wall. Cat. n. 5003 (in part).

From the Upper Gangetic Plain, Moradabad, Thomson, to Sirkim, Behar, Chittagong, Arracan and Burma. Central Provinces & Chota Nagpore, Cluthe.

Stems in small or large tufts, 4-18 in. high, geniculately ascending from a nodose branched stock, base clothed with short hard sheaths. Leanes linear, spreading horizontally, more or less convolute, finely acuminate, glabrous, sometimes flat and $\frac{1}{2}$ in. broad, quite smooth, glaucous; sheath rather tight, smooth, bearded below the month; ligule very short. Panicle 2-6 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, sometimes very narrowly pyramical, white, branches hispid; gls. I and II subequal; fig. gls. $\frac{1}{16}$ in., membranou-, nerves prominent. Anthers $\frac{1}{10}$ in. Grain shortly ovoid, $\frac{1}{30}$ in. — Dwarf states 2-3 in. high occur; and tall ones 2-3 ft. high from the Sikkim Terai and Arracau, with leaves $\frac{1}{2}$ in. broad and a long lax narrow panicle 6 in. long.

- ** Panicle open or more or less contracted or spiciform; margins of flg. gls. eciliate.
- 4. **2.** aspera, Nees Fl. Afr. Austr. 408; annual, panicle large thyrsiform, at length expanding, branches and pedicels long, spikelets linear-oblong $\frac{1}{3}$ by $\frac{1}{24}$ in. erect 4-16-fid., empty gls. subequal, fig. gls. obtuse nerves prominent, keels of palea scaberulous, stamens 3. Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 386. E. tenella, Nees in Wight Cat. n. 1783 (non Linn. nec Benth.). E. paniculata, Steud. Syn. Gram. 278. Poa aspera, Jacq. Hort. Vind. iii. 32. P. paniculata, Rorb. Fl. Ind. i. 340.—Eragrostis, Wall. Cat. n. 3841.

SOUTHERN INDIA; Dindygul, Wight. BANGALORE, Puckle (Ic. in Herb. Kew),

N. and S. CONCAN, Liston. — DISTRIB. Afr. trop. Isle of France.

Stem with the long paniele 2-4 ft., stout, subcreet, branched, smooth. Leaves 8-18 in., flat, keeled, smooth; sheath villously bearded; ligule of long hairs. Paniele 10-20 in. by 4-6 broad, oblong to obovate-oblong, rachis scaberulous, bearded at the nodes with long white hairs; branches solitary or pseudo-whorled, capillary, divided from the base or nearly so, subcreet; pedicels much longer than the small, rather scattered spikelets. Fig. gls. hardly $\frac{1}{15}$ in.; pales obscurely 3-lobed, lobes very obtuse, keels scabrid. Anthers $\frac{1}{10}$ in. Grain subglobose, about $\frac{1}{50}$ in.—Paniele quite unlike that of any other Indian species.

5. E. ciliaris, Link Enum. Hort. Berol. i. 192; annual, panicle spiciform rarely open, branches and pedicels very short glubrous, spikelets about 10 in. long and broad 6-12-fld strongly compressed, empty gls. subequal acute, fig. gls. widely spreading mucronulate, lateral nerves submarginal, keels of palea very long-ciliate, stamens 3.

PLAINS of N. and S. India (not in Ceylon) .- Distrib. Reg. trop.

Stem 1-2 ft., procumbent below and geniculately ascending, slender. Leaves very narrow, flat; mouths of sheath with very long hairs. Panicle 3-6 in., interrupted or lobed below, appearing hairy from the long cilia of the palea, branches very short (except var. Clarkei) divided from the base, glabrous; nodes of glabrous rachis naked. Spikelets very pale, as broad as long, much compressed; fig. gls. subhyaline, scaherulous, often slightly recurved and elegantly distictions; rachilla of spikelet persistent. Anthers \(\frac{1}{120}\) in. Grain elongate ovoid, about \(\frac{1}{10}\) in.

Var. ciliaris proper, Stapf; panicle spiciform more or less lobed or interrupted.

E. ciliaris, Boiss. Fl. Orient. v. 582; Baker Fl. Maurit. 456; Duthie Grass. N.W. Ind. 37, Fodd. Grass. N. Ind. 62; Aitchie. Cat. Panjab. Pl. 169; Lieboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 886; Griseb. Fl. Brit. W. Ind. 582. E. lobata, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 396. E. lepida, Hochst. es A. Rich. Tent. Fl. Abyse. ii. 424. E. plumosa, Boiss. Fl. Orient. v. 582 (escl. Syn.); Benth. Fl. Hongk. 481. E. pulchella, Parl. in Hook. Niger Flor. 186. Mega-

stachya ciliaris, Beauv. Agrost. 74.—Eragrostis, Wall. Cat. n. 5009, 5003 (in part).—N. India from the Panjab to Burma.—Westwd. to trop. Africa and America.

Van begahvetechya Roise El Orient v. 582, pariele chart convert sulindia

Var. bruchystachya, Boiss, Fl. Orient. v. 582; panicle short compact cylindric. E. arabica, Jaub. & Spach Ill. Pl. Orient. iv. 31, t. 322. E. riparia, Nees in Herb. Royle.—Upper Gangetic Plain, Scind & the Concan.—Arabia, Afr. trop.

Var. Clarkei, Stapf; panicle open as in E. tenella .- Delhi, Clarke.

6. **E. tenella**, Roem. & Sch. Syst. ii. 576 (excl. β) (non aliorum); panicle variable, spikelets $\frac{1}{20-8}$ in. by $\frac{1}{24}$ in. broad or less, not strongly compressed 3-9-fld, empty gls. subequal or unequal, fig. gls. oblique not mucronate lateral nerves remote from the margins, keels of palea usually obscurely ciliate, stamens 3, grain ovoid.

Throughout INDIA, in the plains and lower hills, from the PANJAB to MALACCA

and CEYLON. The NICOBAR ISLUS .- DISTRIB. Trop. Asia, Africa.

Very variable, from 6-18 in, high, stems usually stender, many from the root and densely tufted. Leaves narrow. Panicle 2-8 in, long, contracted or spreading, pale green or purplish, excessively branched, oblong ovate or cylindric, never with the long interrupted rachis and pseudo-verticillate branches of E. interrupta.

Var. plumosa, Stapf; panicle open often flexuous branches capillary nodes bearded, spikelets \(\frac{1}{28} \) \frac{1}{6} in. long- or short-pedicelled 3-9-fld., empty gls. unequal I\(\frac{1}{2} \) -\(\frac{1}{2} \) shorter than II, rachilla subarticulate, flg. gls. \(\frac{1}{20} \) in., anthers very minute, grain ovoid about \(\frac{1}{20} \) in. E. despiciens, Schult. Mant. ii. 318. E. elegantula, Nees B., Wight Cat. n. 1781b. E. laxa, Baker Fl. Maurit. 456. E. plumosa, Link Enum. Hort. Berol. i. 192 (non Boiss.); Wight Cat. n. 1786; Thw. Enum. Pl. Zeyl. 373; Trinn. Cat. Ceyl. Pl. 109; Dutkie Grass. N.W. Ind. 38, Fodd. Grass. N. Ind. 61, t. 38, 77; Aitchis. Cat. Panjab Pl. 170; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 385. E. tenella, Roem. & Sch. l. c.; Steul. Syn. Gram. 266. Poa amabilis, Linn. Sp. Pl. 68. P. capillaris, Rozb. Ic. Pict. ined. t. 837. P. despiciens, Link Enum. Hort. Berol. i. 88. P. hirsuta, Herb. Rottl. P. plumosa, Retz. Obs. iv. 20; Kunth Enum. Pl. i. 338; Roxb. Fl. Ind. i. 337. P. tenella, Linn. l. c. 69. Burm. Fl. Zeyl. t. 47, f. 3); Retz. Obs. v. 19; Kunth Rev. Gram. ii. 467, t. 147, Enum. Pl. i. 338, Suppl. 294.—Eragrostis, Wall. Cat. n. 5007.—Throughout India, Burma & Ceylon (C.P. 926, 70).

Var. riparia, Stapf; panicle contracted very narrow flaccid, rachis glabrous, branches subfilirorm or capillary, spikelets as in var. plumosa, empty gls. unequal I = \frac{1}{2} \text{ shorter than II, flg. gls. \frac{1}{2}\text{ in., anthers about \frac{1}{10}\text{ in., grain \frac{1}{0}\text{ in. ovoid. E. plumosa (in part) Thw. Enum. Pl. Zeyl. (CP. 927, 928). E. riparia, Steud. Syn. Gram. 265; Nées in Wight Cat. n. 1787; Duthie Grass. N.W. Ind. 38. E. ciliaris, \text{ \text{ frin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 397. E. plumosa, rar. maritima, Trim. Cat. Ceyl. Pl. 109 (CP. 927). Poa incurva, Herb. Rottl. (in part). P. riparia, Willd. in Ges. Naturf. Fr. Berl. N. Schrift. iv. (1803) 185. P. setacea & laevis, Herb. Rottl. P. tenella, Roxb. Fl. Ind. i. 337; Grah. Cat. Bomb. Pl. 236.—Eragrost. Wall. Cat. n. 5011.—Lower Bengal, and southwid.

Luccadive Islds. CEYLON (CP. 927, 928).

Var. viscosa, Stapf; stem and rachis of panicle b low viscid, panicle stiff stouter with firmer more strongly nerved glumes than in vars. plumosa & riparia, oblong to linear open contracted or compact, branches filiform often very short, nodes glabrous or obscurely bearded, spikelets few-16-fid. often purplish, empty gls. subequal or I slightly shorter, fi. gls 3\(^3\) 1/2 in., anthers about \(^1\) 0/3 in., grain ovoid \(^1\) 0/3 in.—Subvar. \(^a\), aperia, Stapf; punicle oblong or pyramidal open, branches distinctly lengthened. E. viscosa, Trim. in Mem. Acad. Petersb. Ser. VI. \(^1\). (1831) 397; Wight Cat. n. 1785; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 386. Poa ciliaris, Roxb. Ic. pict. ined. t. 832, 856. Herb. Madr. Wall. Cat. n. 5008 A. P. glutinosa, Herb. Roxb. P. plumosa & malabarica, Herb. Heyne ex Wall. Cat. n. 5008 C. D. E. P. Telphulia, Herb. Ham. ex Wall. Cat. n. 5008 B. P. viscosa, Rets. Obs. iv. 20; Roxb. Fl. Ind. i. 386; Grah. Cat. Bomb. Fl. 236; Kunth Enum. Pl. i. 386.—Eragrost. Wall. Cat. n. 5008, 5010.—From the Gangetic Plains & Bombay 386.—Eragrost. Wall. Cat. n. 5008, 5010.—From the Gangetic Plains & Bombay 386.—Eragrost. Wall. Cat. n. 5008, 5010.—From the Gangetic Plains & Bombay 386.—Eragrost.

southwd.—Trop. & S. Africa.—Subvar. S. lasiantha, Stapf; stem 2½ ft. erect branched, nerves of fl. gls. ciliate. E. terebinthacea, Kurz mss.—Pegu, Kurz. Burma, Collett.—Subvar. 7. contracta, Stapf; panicle compact spiciform lobed or interrupted, branches very short. E. mangalorica, Hochst. ex Steud. Syn. Gram. 265. E. viscosa, B. minor, Ness in Wight. Cat. n. 2359. ? E. viscosa, Dals. & Gibs. Bomb. Fl. 298. Poa incurva, Herb. Bottl. (in part).—Deccan Peninsula.

Var. breviculmis, Stapf; stems 1-3 in. usually ascending from a prostrate base, panicle 1-1\frac{1}{2} in. by 3-4 lines broad oblong to ovate-oblong rather dense but not compact, rachis bearded or not, empty gls. subequel, fig. gls. \frac{1}{24} in., anthers \frac{1}{240-240} in.

or less, grain 10 in. - From the Panjab to Behar and Central India.

7. E. interrupta, Beauv. Agrost. 71 (non Roem. & Sch. nec Trin.); panicle very variable usually stiff interrupted, spikelets 1/3-1 in. ovate to linear few or many-fid., fig. gls. obtuse nerves slender, keels of palea scabernlous, stamens 2, grain obovoid.

Throughout India, Burma, Chylon.-Distrib. Mesopot., Afr. trop.

Very variable, from 2-6 in. high with slender stems and ovate panicle to 3 ft. high and branched with the stem as thick as a small geose-quill, and a panicle 1-2 ft. long either contracted with appressed branches or interrupted with many tiers of rather short spreading subwhorled branches. Spikelets usually very minute, from in. with 2-3 fig. gls. to about \(\frac{1}{2}\) in. with many fig. gls., green or pale brown, rarely

coloured.

Var. Koenigii, Stapf; panicle long narrow with short dense pseudowhorls, spike-lets shortly pedicelled usually 6-14-fld, fig. gls. \(\frac{1}{3} \) \(\frac{1}{3} \) in or less. E. Koenigii, Link Enum. Hort. Berol. ii. 294; Steud. Sym. Gram. 266. E. hapalantha, Trin. in Mem. Acad. Petersb. Str. VI. i. (1839) 409 (in part). E. minutiflora, Prest Rel. Hænk. i. 274 (excl. Sym.); Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 386. E. mossulensis, Steud. l. c. 264. E. nutans, Nees. in Wight Cat. n. 1776; Steud. Nom. Ed. II. i. 563; Duthie Grass. N. W. Ind. 38, Fodd. Grass. N. Ind. 63, t. 76; Aitohis. Cat. Panjab Pl. 169; Lisboa l. c. 381; Boiss. Fl. Orient. v. 583. E. Bothii, Steud. Sym. Gram. 267. E. stricta, Steud. l. c. 264. E. verticillata. Nees in Wight. Cat. n. 1784. Pon Corana, & P. diandru, Herb. Ham. ex Wall. Cat. n. 3850 F. D. P. interrupta, Lamk. Ill. i. 185; Poir. Encycl. v. 87; Heyne ex Roth. Nov. Sp. 67; Koen. ex Rosb. Fl. Ind. i. 335. P. Koenigii, Kunth Enum. Pl. i. 346. P. latifolia, Wall. Cat. v. 5001 E. P. nutans, Koen. ex Roth. Noc. Sp. 64; Rosb. Fl. Ind. 385 (non Retz.).—Eragrostis, Wall. Cat. n. 3850 A. D. E. —1. 5005, 5006.—All India. Ceylon, Trimen. Eastwd. to Egypt. As. and Afr. trop. Var. diarrhena, Stapf; panicle long linear-oblong, branches 1-2 in. hardly

Var. diarrhena, Stapf; panicle long linear-oblong, branches 1-2 in. hardly closed simple at the base, spikelets 10-14-fid., fig. gls. 3, in. E. diandra, Aitchis. Cat. Panjab Pl. 169 (non Steud.); Duthie Grass. N.W. Ind. 37; Grissb. in Goett. Nachr. (1868) 76. E. diarrhena, Steud. Syn. Gram. 266. Pos diandra, Roxb. Fl. Ind. i. 336 (non Br.). P. diarrhena, Schult. Mant. 616.—Eragrostis, Wall. Cat.

n. 3850 K. L., 5002, 5004.—Sirmore, Beugal, Mysore, Carnatic.

Var. diplachnoides, Stapf; stem tall stout branched, panicle long effuse or contracted flaccid, branches solitary or 2-3 in a whorl elongate simple or if branched the whorl rarely overtopped by 1 or 2 branches 2-5 in. long, ultimate branches not divaricate, spikelets 6-12-fld, flg. gls. very obtuse rarely $\frac{1}{35}$ in. E. diplachnoides & Hochstetteri, Steud. Syn. Gram. 268. E. nutans, Thw. Enum. Pl. Zeyl. 373; Trim. Cat. Ceyl. Pl. 109. Diplachne elongata & possformis, Hochst. ex Steud. I. c.—Central India, enstwd. to Afr. trop., Clarke, Duthic. Ceylon, Walker, Thursites (CP. 933 (in part) 3259.

Var. tenuissima, Stapf; panicle long loose narrow usually stiff, branches \(\frac{1}{2}-2\) in. pseudo-whorled spreading ramified from the base, branchlets and pedicels divariente filiform to capillary, spikelets few-fid., fl. gls. very obtuse \(\frac{1}{3}\) in. E. aurea, Steud, Syn. Gram. 267. E. caudata, Nees ex Steud. t. c. 264; Duthis Grass. N.W. Ind. 37. E. japonics, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 405. E. tenella \(\theta\), Room. & Sch. Syst. ii. 356. E. tenella, Benth. Fl. Hongk. 431; Fl.

Austral. viii. 643 (non Beauv.); Duthie Fodd. Grass. N. Ind. 65, t. 78. E. tenellula, Steud. Syn. Gram. 279. E. tenuissima, Schrad. ev. Nees Fl. Afr. Austr. 409, 410. Pon japonica, Thunb. Fl. Jap. 31. P. hyemalis, Laka, & speciosa, Herb. Ham. ev. Wall. Cat. n. 3850 C.-B. P. tenella, Br. Prodr. 181 (non Beauv.); Rozb. Fl. Ind. i. 387, Ic. Pict. ined. t. 837. P. tenellula, Kunth Enum. Pl. i. 388.—Eragrostis, Wall. Cat. n. 3850 B. C. H. 5001 A—D.—Temp. & trop. Himal. from the Panjab eastwd, and southwd, to Ceylon; ascends the Himalaya to 7000 ft.—Trop. As.

Sect. II. Ptercessa. Rachilla of spikelet tough, persistent; fig. glumes falling away from its base upwards.—Species 8-24.

- * Spikelets always flat, usually elliptic-ovate to oblong; lateral nerves of fig. gls. very prominent, straight, almost percurrent; pales deciduous with their glumes.
- 8. E. amabilis, Wight & Arn. ex Nees in Hook. & Arn. Bot. Beech. Voy. 251 (excl. Syn. Linn.) annual, panicle oblong or ovoid-oblong open or contracted, branches solitary ramifying from near the base, spikelets $\frac{1}{6}-\frac{1}{2}$ in. ovate rarely oblong or linear-oblong up to 50fld., empty gls. subequal acute 1-nerved, flg. gls. very close set distichously spreading broadly elliptic shortly acuminate, palea elliptic keels winged scabrid. Wight Cat. n. 1777; Wall. Cat. n. 3838; Nees in Act. Acad. Nat. Cur. xix. Suppl. i. (1843) 205. E. polymorphs, Trin. ex Steud. Nom. Ed. II. i. 364, 562. E. rubens, Hochst. ex Mig. Analect. Bot. ii. 26; Steud. Syn. Gram. 265. E. unioloides, Nees ex Steud. l.c. 264; Thw. Enum. Pl. Zeyl. 373; Trim. Cat. Ceyl. Pl. 109; Duthie Grass. N.W. Ind. 38, Fodd. Grass. N. Ind. 65; Aitchis. Cut. Panjab Pl. 170; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 383; Griseb. in Goett. Nachr. (1868) 76. Poa amabilis, Herb. Rottl. (non Linn.). P. multiflora, Roxb. Fl. Ind. i. 338. P. polymorpha, Br. Prodr. 180. P. pseudamabilis, Roxb. Ic. Pict. ined. t. 843. P. rubens, Lamk. Illustr. i. 184, t. 45, f. 2; Kunth Enum. Pl. i. 335. P. unioloides, Retz. Obs. v. 19; Roxb. Fl. Ind. i. 330; Kunth l.c.; Grah. Cat. Bomb. Pl. 236. Briza rubra, Lamk. Ill. i. 187; Kunth l.c. 371. Uniola indica, Spreng. Syst. i. 349; Dalz. & Gibs. Bomb. Fl. 298. Megastachya polymorpha, Beauv. Agrost. 74.

PLAINS OF INDIA and LOWER HIMALAYA, from Kashmir (ascending to 6000 ft.), eastwd. to Burma and southwd. to CEYLON (CP. n. 930).—DISTRIB. As. trop. Stem 6-18 in., rather slender. Leaves usually short, flat; mouth of sheaths naked. Panicle 2-4 in., branches filiform, not very numerous or long, rachis and nodes glabrous. Spikelets broad or narrow, pule or purplish; rachilla tough, internodes very short, $\frac{1}{160}$ in; empty gls. $\frac{1}{35}$ $\frac{1}{30}$ in. 1-nerved; flg. gls. nearly $\frac{1}{12}$ in. long, nucronulate; palea $\frac{1}{3}$ shorter than its gl. Stamens 3, anthers $\frac{1}{100}$ or Grain obovoid or ellipsoid, laterally compressed, about $\frac{1}{3}$ by $\frac{1}{3}$ in.

- ** Spikelets usually linear or linear-oblong, less compressed and with less prominent nerves than in *, or if strongly compressed and nerved then with persistent paleas.
- † Spikelets more or less fascicled on the primary or secondary branches or shortly pedicelled in narrower racemes.
- 9. **E. malayana**, Stapf; annual, panicle ovoid, branches solitary at length spreading flowering to the base, pedicels as long as the spikelets or shorter, spikelets $\frac{1}{10} \frac{1}{3}$ in linear-oblong 10-30-fld., rachilla almost straight internodes very short, gls. all broad closely imbricate, sides

convex, empty gls. unequal broadly ovate acute, fig. gls. ovate shortly acuminate keel curved, keels of palea scaberulous.

PERAK, Wray. MALACCA, Hervey .- DISTRIB. Borneo, Binca.

Stems densely tuited, 10-18 in., erect or geniculately ascending, very slender. Leaves 2-3 in., very narrow, strict, finely acuminate, convolute; mouth of sheath with long lairs. Panicle 2-3 in., open or contracted, branches ramified from near the base, branchlets short contracted filiform, rachis glabrous. Spikelets slightly compressed, rachilla tough; gl. $\frac{1}{3}\frac{1}{6}$ in.; lI $\frac{1}{3}\frac{1}{4}$ in.; flg. gls. $\frac{1}{3}$ 5 in., nucronulate, lateral nerves inconspicuous; palea obovate-oblong, rather shorter than its gl., keels narrow. Grain $\frac{1}{3}$ 0 in., ovoid or ellipsoid, slightly laterally compressed.

10. E. stenophylla, Hochst. ex Miquel Analect. Bot. Ind. ii. 27; branches of panicle much ramified from above the base, pedicels short filiform, spikelets 1-1 in. linear 30-40-fid., rachilla zigzag, empty gls. subequal subacute 1-nerved, fig. gls. ovate acute sides convex, keel curved, palea caducous with the gl. keels scabrid. Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 385. E. Brownei, Nees in Wight Cat. n. 1780 partim (non Steud.). E. elegantula, Nees I. c. 1781, a, \$ (non Steud.); Duthie Grass. N. W. Ind. 37, Fodd. Grass. N. Ind. 63, t. 74. E. gangetica, Steud. Syn. Gram. 266. E. ovina, Ners ex Steud. l.c. 268. PE. Willdenovii. Steud. Nom Ed. II. i. 565. P. amabilis & nutans, Herb. Heyne ex Wall, Cat. n. 3847 A. Poa amabilis, Herb. Rottl. (non Linn.). 15. atroviridis, Herb. Hum. ex Wall. Cat. n. 3814 partim (non Desf.). P. gangeticu, Roxb. Fl. Ind. i. 340. P. nutans, Retz. Obs. iv. 19 (non Roxb.); Thwaites Enum. Pl. Zeyl. 373. P. procera, IIb. Wight ex Wall. Cat. n. 3831 C. P. ovins, A. Rich. Tent. Fl. Abyss. ii. 428. P. viscoss, var. Wall. l.c. n. 3831.—Eragrostie, Wall. Cat. n. 3030 A. 3831 B. C. D., 3832 A. (in part) 3043 E., 3844, 3847.

Throughout India and Burna. Cevicon, Thwaites (CP. 925, 932).—Distrib. Trop. Asia and Africa.

Annual or subp-remial. Stems many, densely tufted, 12-18 in. high, geniculately ascending. Leaves rather short, smooth, usually strict and convolute; sheaths smooth. Panicle ovate or oblong or sublinear, subflexuose, inclined; branches rather distant, alternate, obliquely spreading when ripe, ram fications short, contracted. Spikelets crowded, blue grey, rachilla tough; gl. I $_{31}^{-1}$ in.; II $_{32}^{-1}$ in. or shorter; flg. gls. $_{15}^{-1}$ to $_{31}^{-1}$, in or more, lateral nerves slender; palea rather shorter than its gl., gently curved. Stamens 3, anthers minute about $_{130}^{-1}$ - $_{100}^{-1}$ in. Grain about $_{130}^{-1}$ - $_{100}^{-1}$ in. globosely oblong to subglobose.

11. E. elegantula, Steud. Syn. Gram. 266 (non Nees); perennial, panicle oblong, branches solitary short, pedicels very short, spikelets \(\frac{1}{2}\)-\frac{1}{2}\) in linear to linear-oblong 8-30-fld., rachilla tough, empty gls. subequal acute 1-nerved, fig. gls. ovate acute sides convex, palea caducous with the gls. keels scabrid. Griseb. in Gortt. Nachr. (1868) 75; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 384. E. Brownei, Nees ex Wight Cat. n. 1780; Aitchis. Cat. Panjab. Pl. 169; Duthis Grass. N.W. Ind. 36, Fodd Grass. N. Ind. 62. E. luzoniensis, Steud. l.c. 266. Poa; atroviridis, Ham. ex Wall. Cat. n. 3843 A. P. convoluta, Heyne in Herb. Rotil.; Wall. Cat. n. i 831 E. P. Chariis, Schult. Mant. i. 314. P. diandra & cernna, Herb. Wight ex Wall. Cat. n. 3843 B. O. P. distans & laevis, Hb. Heyne ex Wall. l. c. n. 3840. P. elegantula, Kunth Revis. Gram. i. 340, Enum. Pl. i. 346. P. elegans, Roxb. Fl. Ind. i 338. P. viscosa, var. Herb. Heyne in Wall. Cat. 3831 A.—Eragrost. Wall. Cat. n. 3830 B. C., 3831 A, 3832 B, 3833, 3840, 3843, 3845 A (in part).

Throughout INDIA, BURNA and CEYLON (Wallich, Gardner).

Stem tall, 1-3 ft., suberect from a spreading base, usually stout and branching, but sometimes slender and short, smooth. Leaves few, short, smooth, flat or subconvolute; mouth of sheath bearded. Panicle nodding, branches rather distant, spreading, ramifying from above the base, sometimes abbreviated and the spikelets clustered on the rachis, rachis glabrous. Spikelets purplish or green; empty gls. \(\frac{1}{3\cdot 5} \) in, j fig. gls. \(\frac{1}{3\cdot -1} \) in, lateral nerves elender; internodes of rachilla \(\frac{1}{3\cdot 0} \) in.; pulse rather shorter than its gls. Stamens 3, anthers about \(\frac{1}{3\cdot 2} \) in. Grain oblong, \(\frac{1}{3\cdot 0} \) in.

12. El. elongata, Jacq. Eclog. Gram. 3, t. 3; perennial, panicle very variable, branches usually simple, spikelets very shortly pedicelled rather crowded subparallel linear \$\frac{1}{2} \sqrt{0}\$ in. 10-25-fld., rachilla rather stout, empty gls. ovate-lanceolate acute. 1 1-nerved, II 1-3-nerved, flg. gls. ovate-lanceolate very acute nearly flat, keel almost straight, palea strongly curved, keels very stout scabrid. E. bahiensis, Hance in Journ. Linn. Soc. x ii. (1873) 136; Griseb. in Goett. Nuchr. (1868) 76 (non Schrad.). E. Browneana, Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 205. E. Brownii, Nees Fl. Afr. Austr. 396; Steud. Syn. Grom. 279; Thwaites Enum. Pl. Zeyl. 373; Trim. Cat. Ceyl. Pl. 109; Benth. Fl. Hongk. 432, Fl. Austral. vii. 646 (in part). E. Cumingii, Steud. l. c. 266. E. interrupta, Steud. l. c. 279 (non Beauv.) E. orientalis, Nees in Nov. Act. l. c. 206; Thw. l. c. 373; Trim. l. c. 109. E. pubescens, Steud. l. c. E. Willdenoviana, Nees in Hook. & Arn. Bot. Beech. Voy. 252. E. zeylanica, Nees & Mey. in Nov. Act. l. c. 204; Thwaites l. c.; Trim. l. c. Poa Brownei, Kunth Kevis. Gram. i. 112, Enum. Pl. i. 333. ? P. dependens, Hornem. Enum. Hort. Hafn. Suppl. 2. P. elongata, Willd. Enum. Hort. Berol. i. 108; Kunth Enum. i. 384. P. interrupta & polymorpha, Br. Prodr. 180. P. pulchella, Wall. mss. Megastachya elongata & polymorpha, Beauv. Agrost. 74, 167. — Eragrost. Wall. Cat. n. 3836, 3845 (in part).

LOWER BENGAL, CHITTAGONG, BURMA, the NICOBAR ISLDS., and CEYLON (C.P.

931, 3047, 3251).—DISTRIB. Asia trop., Mulaya, Australia, N. Caledon.

Stems tufted, siff, tall or short, stout or slender, simple or branched. Leaves narrow, strict, flat or convolute; mouth of sheath bearded. Panicle oblong or owate, with solitary distant spreading filiform branches, or from the shortening of these subspiciform, rachis glabrous. Spikelets acute, dark brown or reddish; gl. I 1/2 in.; flg. gls. usually 1/3 in., firm, lateral nerves rather prominent; rachilla rather stout, internodes 1/3 in.; palca 1/4 shorter than its gl. Anthers 1/4 or 3/3 in. in the Indian specimens. Grain ovoid to subglobose, 3/3 in.

- †† Spikelets not fascicled, usually more or less divaricate when ripe.
- § Spikelets $\frac{1}{16}$ — $\frac{1}{16}$ in. broad; fig. g/s. broad, more or less obcuse, $\frac{1}{16}$ — $\frac{1}{16}$ in. long, lateral nerves strong.—Annuals.
- 13. **22. barbulata**, Stapf.; leaf-margins eglandular, panicle oblong very loose, branches solitary, pedicels very slender, spikelets few \$-\frac{1}{2}\$ in. ovate-oblong or linear narrowed upwards 10-25-fld., empty gls subequal ovate obtuse, rachilla stout nodes bearded, fl. gls. close-set very broadly ovate obtuse, palea broadly ovate persistent keels scabrid, grain subglobose.—Eragrostis, Wall. Cat. n. 3839.

LOWER BURMA; road to the Petroleum Wells, Wallick.

Annual, erect, 3-4 ft. high, branched. Leaves 12-18 in., up to \(\frac{1}{2}\) in. broad, usually very narrow, subconvolute, and sheaths pubescent or villous below the middle. Panicle 6-12 in.; nodes of rachis woolly at the axils; branches very

distant, scaberulous, spreading, flexuous, simple at the base; pedicels as long or longer than the pale olive-green spikelets. Gi. I 1-nerved; II 1-3-nerved; rachilla tough, internodes about $\frac{1}{10} - \frac{1}{80}$ in.; flg. gls. $\frac{1}{10}$ in., nerves strong. Stamens 3; anthers linear, about $\frac{1}{30}$ in. Grain $\frac{1}{30}$ in. long.—A stately species.

14. E. tremula, Hochst. & Steud. Syn. Gram. 269; leaf-margins eglandular, panicle large ovate very loose branches solitary, pedicels very slender, spikelets versatile 1 in. or more linear narrowed upwards 10-70-fld., empty gls. subequal subobtuse, rachilla tough glabrous, fig. gls. close-set very broadly ovate subobtuse, palea obovate-oblong persistent keels scabrid, grain globose. Duthie Fodd. Grass. N. Ind. 65, t. 79; Lishoa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 382; Boiss. Fl. Orient. v. 581. E. multiflora, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1841) 401; Dalz. & Gibs. Bomb. Fl. 298; Duthie Grass. N.W. Ind. 38; Aitchis. Cat. Panjab. Pl. 169. E. rhachitricha, Hochst. ex Miquel Analect. Bot. Ind. ii. 25. Poa curvata, Hb. Heyne ex Wall. Cat. n. 3849. P. multiflora, Roxb. Fl. Ind. i. 338 (non Forsk.). P. tremula, Lamk. Illust. i. 185; Kunth l. c. 332.—Eragrost. Wall. Cat. l. c.

Northern India; from the PANJAB to BENGAL and BURMA, and southward to

the CARNATIC .- DISTRIB. Affghan., Africa trop.

Annual. Stems densely tufted, suberect, 6-24 in., leafy chiefly at the sometimes hardened bese. Leaves few, short, very narrow; mouth of sheath slightly hairy. Panicle often as long as the rest of the plant and 8 in. broad, nodding; rachis glabrous, axils bearded, branchlets and pedicels roughish; pedicels longer or shorter than the spikelets which are pale green or purplish. Empty gls. $\frac{1}{16}$ $\frac{1}{20}$ in., 1-nerved; internodes of rachilla $\frac{1}{20}$ in., thickened upwards; fig. gls. $\frac{1}{16}$ $\frac{1}{12}$ in., nerves strong; palea a little shorter than its gl. Stamens 3, anthers $\frac{1}{100}$ in. Grain hardly $\frac{1}{2}\pi$ in. diam.

15. E. major, Host Gram. Austr. iv. 14, t. 24; leaf-margins (in Indian specimens) glandular, panicle oblong to ovate-oblong stiff, branches subsolitary spreading, pedicels very short, spikelets 1-1 in. ovate-oblong or linear few to 50-fld., empty gls. ovate acute, rachilla tough, flg. gls. broadly ovate subacute, palea broadly obovate much curved, keels scabrid or ciliolate, grain globose. E. flexuosa, Steud. Syn. Gram. 266; Duthie Grass. N.W. Ind. 37. E. megastachya, Link Enum. Hort. Berol. i. 187; Kunth Enum. Pl. i. 333; Reichb. Ic. Fl. Germ. t. 91; Wight Cat. n. 1778; Thwaites Enum. Pl. Zeyl. 373; Trim. Cat. Ceyl. Pl. 109; Aitchis. Cat. Panjab Pl. 169; Duthie Grass. N.W. Ind. 38, Fodd. Grass. N. Ind. 63, t. 75; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 382; Ledeb. Fl. Ross. iv. 382; Boiss. Fl. Orient. v. 580. E. multiflora, Aschers. ex Boiss. l. c. E. poaeoides, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 404. E. vulgaris var. megastachya, Coss et Dur. Fl. Alger. 148. Poa cilianensis, All. Fl. Pedem. ii. 246, t. 91, f. 2. P. elegans, Herb. Wight & Herb. Ham. ex Wall. Cat. n. 3828 C. D. P. Eragrostis, Cav. Ic. i. 63, t. 92; Sibth. Fl. Gree. t. 73. P. flexuosa, Roxb. Fl. Ind. i. 339. P. multiflora, Forsk. Fl. Æg. Arab. 21. P. polymorpha, Koen. ex Wall. l.c. n. 3828 A. P. Rox-burghiana, Schult. Mant. ii. 315. P. subsecunda, Herb. Ham. ex Wall. l.c. n. 3828 D. P. tortuosa, Spreng. Syst. Veg. i. 345. Megastachya Eragrostis, Beauv. Agrost. 74. Briza Eragrostis, Linn. Sp. Pl. 70; Schreb. Besch. Grees. ii. 74. B. oblonga, Moench. Meth. 185.-Eragrostis, Wall. Cat. n. 3828, 3837.

Throughout the Plains and lower Hills of India and Burma, ascending to 5200 ft. in the Himalaya. Crylon, (C.P. 3163).—Distrib. Westward to S. Europe, Asia trop. and subtrop.

- Annual. Stem 1-2 ft., usually stout and branched, but very variable. Leaves flat, smooth, flaccid, narrow, rarely \(\frac{1}{2}\) in. broad; sheath sparingly bearded. Paniele 2-8 in., sometimes contracted, rachis glabrous, branches stiff or flexuous, ramifying from or near the base. Spikelets slightly narrowed upwards, dark olive-grey; Gl. I, 1- or sub-1-3-nerved; II 3-nerved; flg. gls. \(\frac{1}{12}\) in., uppermost usually empty and smaller, nerves strong; palea \(\frac{1}{2-\frac{1}{2}}\) shorter than its gl. Anthers about \(\frac{1}{20}\) in. Grain \(\frac{1}{12}\) in., loose within the turgid gl.
- §§ Spikelets $\frac{1}{8}$ $\frac{1}{3}$ in.; fl. gls. less than $\frac{1}{15}$ in. or if longer then narrower and more or less acute.
- ‡ Panicle rather stiff, branches and lateral pedicels usually short lateral nerves of flq. gls. strong.—Leaf-margins often glandular.
- 16. E. minor, Host Gram. Austr. iv. 15, Fl. Austr. i. 135; leaf-margins glandular, panicle ovate or oblong rather stiff, branches solitary capillary ramifying from near the base, pedicels short, spikelets ½-½ in. linear to ovate up to 12-fid., empty gls. subequal acute 1-nerved, fig. gls. broadly ovate obtuse, grain globose or ellipsoid-globose dorsally convex. E. poaeformis, link Hort. Berol. i. 188; Reichb. Ic. Fl. Germ. t. 91; T. Nees Gen. Fl. Germ. Monocot. n. i. 55. E. poaeoides, Beauv. Agrost. 76; Griseb. in Goett. Nachr. (1868) 74; Duthie Grass. N.W. Ind. 38, Fodd. Grass. N. Ind. 65; Aitchis. Cat. Panjab Pl. 170; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 387; Ledeb. Fl. Ross. iv. 380; Boiss. Fl. Orient. v. 580. E. poaeoides β, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 404. Poa Eragrostis, Linn. Sp. Pl. 68 (in part); Kunth Enum. Pl. i. 332; Schreb. Beschr. Græs. ii. t. 38; Host Gram. Austr. ii. 50, t. 69. Briza Eragrostis, Vill. Fl. Delph. ii. 50 (non Linn.).

PLAINS OF NORTHERN INDIA, ascending the Himalaya to 8000 ft., from the Panjab eastwards to Bengal. The Concan, Jacquemont, &c. Western Tiber; Ladak, alt. 12-13,000 ft., Thomson.—Distrib. Westward to S. Europe, N. Asia.

Annual. Stems 6-18 in., densely tufted, slender. Leanss rather short, flat; mouth of sheath slightly bearded. Panicle 2-6 in., rachis glabrous, branches spreading when ripe. Spikelets pale green to dark purplish or olive-grey, glistening; rachilla tough; gls. I and II $\frac{1}{18}$ — $\frac{1}{16}$ in., ketl scabrid; flg. gls. $\frac{1}{18}$ rarely $\frac{1}{18}$ — $\frac{1}{16}$ in., lateral nerves atrong; palea $\frac{1}{8}$ shorter than its gl., obovate-oblong, keels scabrid or subciliate. Stamens 3, anthers $\frac{1}{100}$ in. Grain $\frac{1}{100}$ in. or more, dorsally rounded or slightly flattened.—The glands are a very constant character. A single Bombay specimen is eglandular, but placed here from its strong resemblance to glanduliterous specimens also from Bombay. The Tibetan specimens are very small, 1-6 in. high.

17. **E. Rottieri**, Stapf; leaf-margins eglandular, mouth of sheath naked, panicle oblong open rather stiff, branches solitary or lower geminate ramifying from near the base, pedicels of lateral spikelets very short, spikelets $\frac{1}{8} - \frac{1}{6}$ in. linear 6-12-fld., empty gls. subequal, rachilla tough, flg. gls. oblong subacute, palea persistent, grain terete. E. viscosa, Wight Herb. propr. n. 1785, in part. Poa pauciflora, Herb. Rottl.

The CARNATIC; at Tranquebar, Heyne, Rottler, Wight.

Leaves 1.-7 in., flat or more or less convolute. Panicle 2-6 in., rachis naked, branches filiform to capillary. Spikelets pale brown or white; empty gls. about $\frac{1}{2^{1}}$ s in.: flg. gls. $\frac{1}{18} = \frac{1}{2^{1}}$ in., lateral nerves strong; palea rather shorter than its gl., keels scaberulous. Stamens 3, anthers about $\frac{1}{16}$ s in. Grain $\frac{1}{2^{1}}$ s in.—Rottler's P. pauciflora is a tall form with few spikelets. Wight's specimen has the stem visoid

below the panicle as in E. tenella var. viscosa, with certain forms of which P. Rottleri has much in common. The persistent rachilla with deciduous glumes of E. Rottleri are as in E. minor, as are the scabrid not ciliate keels of the palea.

18. **E. Willdenoviana**, Nees in Wight Cat. n. 1779 (non in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 205); leaf-margins rarely glandular, panicle short ovate stiff open, branches solitary capillary, pedicels short, spikelets $\frac{1}{6}-\frac{1}{4}$ in. by $\frac{1}{25}$ in. linear pale up to 25-fid., empty gls. very unequal, I minute hyaline nerveless, fl. gls. broadly elliptic acute, palea oblong persistent, grain truncate at both ends dorsally grooved. E. poaeoides, Trin. Cat. Ceyl. Pl. 109; Herb. Ind. Or. H. f. & T. (the Carnatic plant). Poa glabra & lævis, Rottl. mss. P. P. polymorpha, Koen. ex Rottl. in Schrift. Naturf. Fr. Berl. iv. (1803) 194.—Eragrostis, Wall. Cat. n. 3848.

MYSORE, Rottler, Heyne; Dindygul, Wight. CEYLON; Trincomalee, Glenie (C.P. 3944).

Annual. Stems 4-18 in., very slender, smooth, rigid, erect or geniculately ascending. Leaves short, flat, narrow, erect, rather rigid; mouth of sheath naked. Panicle 1-3 in., branches spreading when ripe, ramifying from near the base; pedicels (except sometimes the terminal) shorter than the spikelets. Spikelets olivegrey or greenish; gl. I $\frac{1}{20-36}$ in; II ovate, acute, $\frac{1}{35}$ in., 1-nerved; flg. gls. $\frac{1}{15}$ $\frac{1}{35}$ in, lateral nerves strong; palea $\frac{1}{2}$ shorter than its gl., keels scaberulous. Stamens 3, anthers about $\frac{1}{100}$ in. Grain oblong, $\frac{1}{36-60}$ in., dorsally flattened and grooved.—This may prove to be E. polymorpha, Roem. & Sch. Syst. ii. 575. Rottler's specimen was named P. polymorpha, but that name was crossed out and replaced by P. glabra, Nob. E. Willdenoviana, Nees in Hook. & Arn. Bot. Beech. Voy. (of China) is E. elongata.

- ‡‡. Panicle very loose, ramifications very slender often flexuous or flaccid; lateral nerves of flg. gls. usually faint.—Leaves eglandular.
- 19. **E. tenuifolia**, Hochst. in Flora, xxiv. (1841) i. Intell. 20, name only; ex Steud. Syn. Gram. 268; perennial, panicle oblong to ovate very open, rachis glabrous, branches solitary or 2-nate distant, spikelets $^2-\frac{1}{15}$ in. by $\frac{1}{5}$ in linear 5-15-fld., empty gls. very unequal, I minute hyaline, rachilla tough, fl. gls. ovate acute, subacute or apiculate, palea $\frac{1}{5}$ shorter than its gl. strongly curved persistent, grain obovate-oblong. E. collocarpa, K. Schum. in Engl. Pflanzenw. Deutsch-Ost. Afr. C. 114. PE. mucronata, Roem. & Sch. Syst. ii. 577. E. parviglumis, Hochst. ex Steud. l.c. 267. Poa tenuifolia, A. Rich. Tent. Fl. Abyss. ii. 425.

NILGHIRI HILLS, Hohenacker. RELGAUM, Ritchie; Satpura Hills, Thompson.

-DISTRIB. Africa trop.

- Stem 2-3 ft., erect, slender, branched. Leaves long, very narrow; mouth of sheath naked. Panicle 3-6 in.; branches ramifying from near the base and branchlets rather distant, spreading, filiform, stiff, shorter than in E. nigra. Spikelets olive-grey; gl. I $\frac{1}{10}$ — $\frac{1}{10}$ line nerveless; II remote from I, about $\frac{1}{10}$ in., ovate, subscute, nerveless or faintly 1-nerved; fig. gls. $\frac{1}{12}$ in., keels of palea scabrid. Stamens 3, anthers $\frac{1}{12}$ in. Grain $\frac{1}{12}$ in., slightly compressed, dorsally grooved.
- 20. E. papposa, Steud. Nom. Ed. II. i. 564; perennial, panicle ovoid very delicate lax open sparingly branched, rachis glabrous, branches solitary rarely 2-nate branchlets stiff divaricate, pedicels long capillary, spikelets \(\frac{1}{6}\)-\frac{1}{6}\] in linear 7-23-fld., empty gls. subequal or I shorter hyaline, rachilla tough, fig. gls. broadly ovate margins above hyaline, palea obtuse denticulate persistent, grain obovoid. Wille. & Lange Prodr. Fl. Hispan. i. 83; Griseb. in Goett. Nachr. (1868) 75. E. atro-virens, Lange in Koebj.

Vedinsk. Meddel. (1860) 47 (non Desf.). E. rigidifolia, Hochst. Herb. Mem. Div. Forsk. (nomen.). E. speirostachya, Coss. et Dur. ex Lange l. c. E. verticillata, Coss. ex Lange l. c. (non Cav.). E. vulgaris, nar. speirostachya, Coss. et Dur. Fl. Alger. 148. Poa nigra, Clem. ex Wilk. & Lange Prodr. Fl. Hisp. i. 83. P. papposa, Desf. in Roem. & Sch. Syst. ii. 585. Megastachya? papposa, Roem. & Sch. l. c.

N.-EASTERN PANJAB; common in the Trans-Indus districts; Rawul Pindi, &c.,

Stewart, Aitchison .- DISTRIB. Westward to Arabia, N. Africa, and Spain.

Stem 12-18 in., very slender, simple. Leaves short, strict, very narrow, convolute; mouth of sheath bearded with long silky hairs. Panicle 4-8 in.; rachis filiform; branches spreading, alternate, almost capillary, naked below, loosely branched beyond the middle with capillary spreading branchets. Spikelets very pale yellow or dark or pale olive-grey; gl. I $\frac{1}{35}$, $\frac{1}{35}$ in. or less, nerveless; II $\frac{1}{35}$, $\frac{1}{35}$ in., faintly 1-nerved; flx. gls. about $\frac{1}{17}$, in.; palea rather shorter, keels scabrid. Stamens 3, anthers $\frac{1}{100}$ in. Grain $\frac{1}{100}$ $\frac{1}{35}$ in., dorsally grooved.—A very elegant species, with usually quite pale very narrow spikelets.

21. E. pilosa, Beauv. Agrost. 71; annual, panicie oblong to pyramidal flaccid open or contracted, rachis glabrous, or hairy, branches usually more or less whorled and branchlets very slender, pedicels longer or shorter than the spikelets which are 1 in. linear 5-12-fld., empty gls. unequal hyaline, rachilla tough, fig. gls. ovate acute, palea subpersistent keels scaberulous, grain ellipsoid. Reichb. Ic. Fl. Germ. t. 91; T. Nees Gen. Fl. Germ. Monocot. i. n. 55; Thw. Enum. Pl. Zeyl. 373; Trim. Ca. Ceyl. Pl. 209; Wight Cat. n. 1784, 1784b.; Duthie Grass. N.W. Ind. 38, Fodd. Grass. N. Ind. 64; Aitchis. Cat. Panjab Pl. 170; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 381, Ledeb. Fl. Ross. iv. 382; Boiss. Fl. Orient. v. 881; Benth. Fl. Hongk. 432, Fl. Austral. vii. 645; Baker Fl. Maurit. 455; Griseb. Fl. Brit. W. Ind. 532. E. elegantula, a, Nees in Wight Cat. n. 1782. E. indica, Steud. Syn. Gram. 264. E. parviflora, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 411. E. pellucida, Steud. l. c. 279. E. punctata, Link. ex Steud. Nom. Ed. II. i. 561, Syn. Gram. 264. E. verticillata, Roem. & Sch. Syst. ii. 575; Reichb. Ic. Fl. Germ. t. 9; Aitchis. Cat. Panjab Pl. 170. Poa amabilis, Herb. Heyne ex Wall. Cat. n. 3829 B. P. indica, Koen. ex Rottl. in Ges. Naturf. Fr. Berl. Neue Schrift. iv. (1803) 194. P. nutans, Herb. Wight ex Wall. Cat. n. 3829 D. P. parviflora & pellucida, Br. Prodr. 180. P. Phullica, Herb. Ham. ex Wall. l. c. 3829 C. & 5012 (Phulcia). P. pilosa, Linn. Sp. Pl. 68; Host Grum. Austr. ii. 168, t. 68; Kunth l. c. 329. P. punctata, Linn. f. Suppl. 109; Kunth Enum. Pl. i. 330; Roxb. Fl. Ind. i. 338. P. tenella, Herb. Heyne ex Wall. l.c. 3829 B. P. verticillata, Cav. Ic. i. 63, t. 93; Kunt! Enum. 329. Milium tenerum, Herb. Heyne ex Wall. l. c. 3829 B.—Eragrostis, Wall. Cat. n. 3829.

Throughout India and BUBMA; ascending the Himalaya to 5000 ft, or more. CEYLON; common (C.P. 929).—DISTRIB. S. Europe and most warm countries.

Stom 3 in.-3 ft., tufted, erect, usually very slender and simple, rarely stout and branched. Leaves short, narrow, flaccid or strict and convolute, rarely elongate; mouth of sheath bearded. Panicle very variable in size and form, erect inclined or uodding; rachis hairy or not at the nodes; branches filiform or capillary, fascicled or sub-whorled, simple below, lower sometimes 6 in. long. Spikelets usually grey tipped with purple; empty gls. nerveless or II faintly 1-nerved; flg. gls. 10-10 in. Stamens 3, anthers 10 in., violet. Grain 15-15 in., base laterally apiculate.— Dwarf specimens 2-4 in. high look very different from the ordinary state of the plant.

22. E. nigra, Nees ex Steud. Nom. Ed. II. i. 563, Syn. Gram. 267; perennial, basal sheaths narrow terete or obscurely compressed, paniele oblong to ovate large open lax-fid., branches usually many in wborls or fascicles rarely solitary or geminate, spikelets up to ½ in. linear to oblong 3-9-fid., empty gls. subequal acuminate strongly 1-nerved, fig. gls. ovate acute, palea obtuse denticulate persistent, grain short truncate at both ends. Griseb. in Goett. Nachr. (1868) 75; Duthie Grass. N.W. Ind. 38. E. atropurpurea, Hochst. ex Steud. Syn. Gram. 267. E. amabilis, Willd. non Linn. ex Ham. in Wall. Cat. n. 3842. E. paniculata, Thwaites Enum. Pl Zeyl. 373 (non Steud.).—Eragrostis, Wall. Cat. n. 3834, 3835, 3842, 3846.

Temp. and trop. HIMALAYA, ascending to 9000 ft. from Simla to Sikkim and the Keasia Hills, and southward throughout the Deccan Peninsula. Ceylon,

Thwaites (C.P. n. 2626).

Stem 6 in.-3 ft., erect, stout or slender, usually stout and leafy at the base, simple or branched. Leaves in small forms chiefly basal and flat, in taller elongate; mouth of sheath bearded. Panicle up to 2 ft. long and broad, very copiously but loosely branched except in small specimens, rachis glabrous at the nodes, branches simple below, pedicels usually longer than the spikelets. Spikelets olive-grey; empty gls. membranous, keels scabrid; fig. gls. 1 in. Stamens 3, anthers 10 in. Grain 13 in. or smaller, dorsally slightly grooved.—Habit as variable as of E. pilosa.

23. E. ferruginea, Beauv. Agrost. 71; perennial?, basal sheaths broad compressed keeled, panicle oblong, branches solitary or 2-nate filiform rather stiff, pedicels longer than the spikelets, spikelets \(\frac{1}{4}\) in linear to ovate 3-11-fid., empty gls. unequal acute 1-nerved, rachilla tough, fig. gls. ovate acute or acuminate, palea obtuse much shorter than its gl. persistent keels scabrid, grain obvoid truncate at both ends. Franch. & Sav. Enum. Pl. Jap. ii. 177; Miq. Prolus. Fl. Jap. 188. E. orientalis, Trin. in Bunge Enum. Pl. Chin. Bor. 71, in Mem. Acad. Petersb. Ser. VI. iv. II. (1838) Suppl. 73. Poa ferruginea, Thunb. Fl. Jap. 50.

SIKKIM HIMALAYA; Lachoong Valley, alt. 9000 ft., in meadows with E. nigra,

J. D. H .- DISTRIB. N. China, Japan.

Stem with the panicle in the Sikkim specimen 18 in., erect. Leaves 3-5 in., narrow, or the lower broad at the base; sheath naked at the mouth. Panicle 4-6 in., shorter than in E. nigra, with stouter branches and fewer spikelets; branches rather wiry, bearing few dark spikelets. Spikelets dull green to violet. Gl. I about $\frac{1}{6}$ in., shorter than II; fig. gls. $\frac{1}{14}$ in. Stamens 3, anthers $\frac{1}{13}$ in. or less. Grain $\frac{1}{13}$ in., slightly grooved or flattened dorsally.—I have seen only a poor Indian specimen, but it seems to be identical with the Chinese and Japanese plant. Bunge says that the same plant is cultivated in Hort. Petrop. from Nepal seeds.

- B. Sect. III. Desmostaghya, Stapf. Spikelets much compressed, imbricate, secund, sessile and jointed on the very short densely crowded branchlets of a tall narrow racemiform panicle, deciduous, acute; rachilla subarticulate.
- 24. E. cynosuroides, Beauv. Agrost. 71, 162; perennial, tall, branched from the base, leafy, panicle linear-elongate, branches very short crowded, densely covered from the base with sessile imbricating much compressed deflexed spikelets \(\frac{1}{2} \) in. long up to 30-fld., empty gis. very unequal, rachilla tough, fig. gls. broadly ovate acute, palea shorter than its gl. Steud. Syn. Gram. 264; Wight Cat. n. 1774, 1774b.; Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 415; Dalz. & Gibs. Bomb. Fl. 298; Aitchis

Cat. Panjab. Pl. 169; Duthie Grass. N.W. Ind. 37, Fodd. Grass. N. Ind. 62, t. 40; Boiss. Fl. Orient. v. 583; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 387. Poa cynosuroides, Retz. Obs. iv. 20; Roxb. Fl. Ind. i. 333; Del. Fl. Ægypt. 159, t. 10; Grah. Cat. Bomb. Pl. 236; Kunth Enum. Pl. i. 227. Leptochloa bipinnata, Hochst. in Flora, xxxviii. (1855) 422. Briza bipinnata, Linn. Syst. Nat. x. 875. Cynosurus durus, Forsk. Fl. Ægypt. Arab. 71. Dactylis interrupta, Herb. Rottl. Uniola bipinnata, Linn. Sp. Pl. Ed. II. 104.—Eragrost. affine & Eragrostoides, Wall. Cat. n. 3821, 5016.

PLAINS of INDIA, from Peshawur and Sind to Burma and southward, in moist

places. (Not in Ceylon).-DISTRIB. Westward to Syria and N. Africa.

Rootstock stout, creeping; stolons very stout clothed with shining sheaths; stems 1-3 ft., tufted, smooth, erect, stout. Leaves many, basal fascicled, very long, rigid, long acuminate tips filiform, margins hispid; mouth of sheath with long hairs; ligule 0. Panicle 6-18 in. by 1 rarely 2 in. broad, strict, erect, narrowly pyramidal or columnar, often interrupted; rachis puberulous, branches $\frac{1}{4}$ -1 in., very many crowded; branchlets rigid, glabrous or hispidulous, spreading. Spikelets unilateral, 2-seriate and crowded, deflexed, pale brown, rather shining; internodes of rachilla very short; gl. I $\frac{1}{10}$ in.; II about $\frac{1}{15}$ in., obtuse; fig. gls. $\frac{1}{15}$ and, coriaceous; palea $\frac{1}{15}$ aborter than its gl., rather coriaceous, keels minutely scabrid. Stamens 3, anthers $\frac{1}{25}$ in. Grain less than $\frac{1}{40}$ in., obliquely ovoid, laterally compressed, obscurely trigonous.

- C. Sect. IV. Plagiostachya, Benth. Spikelets secund distichously spreading in a long simple slender terminal spike.
 - * Keels of palea distinctly winged.
- 25. **E. leioptera**, Stapf.; perennial, leaves convolute wiry, spikelets $\frac{1}{3}-\frac{1}{2}$ in. oblong compressed 10-20-fld., glumes tumid, I $\frac{1}{14}$ in. acute, wings of keels of palea $\frac{1}{100}$ in. broad eciliate.

KHASIA HILLS, alt. 4-5000 ft., Griffith, &c.

Slems 1-2 ft., densely tufted, erect, very slender, strict. Leaves 8-12 in., glabrous, stout, terete, pungent; sheaths short. Spike 6-10 in., erect, strict; rachis angular, smooth. Spikelets not crowded, suberect; empty glumes 1, in. subequal, or I shorter; I acutely keeled; II dorsally rounded; glg. gls. broadly ovate, obtuse or subacute, 1, in.; wings of palea hyaline. Anthers about 1, in. long.—The more tumid glumes at once distinguish this from E. bifaria.

26. E. bifaria, Wight ex Steud. Nom. Ed. II. i. 562, Syn. Gram. 264, Suppl. 282; perennial, leaves flat or complicate and keeled, spikelets \(\frac{1}{2}\) in. ovate-oblong rarely linear much compressed 6-40-fld., wings of keels of palea about \(\frac{1}{100}\) in. broad ciliate. Wall. Cat. n. 3827 B. C.; Wight Cat. n. 1773; \(\frac{1}{2}\) Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 387. E. thraulostachys, K. Schum. ined. Poa bifaria, Vahl Symb. ii. 19; Rozb. Fl. Ind. i. 331; Kunth Revis. Gram. i. 334, t. 80, Enum. Pl. i. 327, Suppl. 282.

The DECCAN PENINSULA, Heyne, &c .- DISTRIB. Africa trop.

Stem 1-3 ft., densely tufied, erect, simple, subcompressed, glabrous, base clothed with the soft fibres of old sheaths. Leaves 2-2½ in., linear, wiry, sometimes ½ in. broad, flexuous, acute, rigid, smooth; sheaths scaberulous, keeled; ligule a ciliate line. Spike 10-12 in., ovate to oblong and 15-20-fid., rarely linear flexuous and up to 40-fid., erect, rachis smooth, subcompressed. Spikelets spreading, lower fewer-fid., olive-grey or -green; gl. I very acute or acuminate; II almost ½ in., keel very stout, rounded; fig. gls. ½ in., broadly ovate, subacuminate, keel scaberulous above, nerves faint. Stamens 3, anthers ½ in.

27. **E. Collettii**, Stupf; perennial, leaves filiform convolute, spikelets $\frac{1}{4-\frac{1}{3}}$ in. linear or oblong-linear slightly compressed 6-12-fid., glumes tumid, wings of keels of palea about $\frac{1}{300}$ in. broad minutely ciliate.

BURMA; Pinmona, Abul Huk; Meiktalla, Collett.

Stems 18-20 in., densely tufted, very slender, bases densely clothed with a brush of soft filiform fibres $\frac{3}{4}$ in. long. Leaves 2-4 in., glabrous or sparsely hairy. Spike 5-7 in., erect, strict or slightly curved; rachis slender, terete, smooth. Spikelets purplish, erect, close-set, almost imbricating; empty gls. subequal, $\frac{1}{16}-\frac{1}{14}$ in., I acutely keeled; II dorsally rounded; fig. gls. $\frac{1}{18}$ in. or less, turgid, broadly ovate, obtuse or acute with incurved tips; palea almost as long as the gl., dorsally pubescent. Anthers almost $\frac{1}{2}$ in.

- ** Keels of palea not or obscurely winged
- 28. **E. nardoides**, Trin. in Mem. Acad. Petersb. VI. i. (1831) 415; perennial leaves 3-9 in. almost capillary convolute with tufts of hairs on the surface below the middle, spike very long slender, spikelets $\frac{1}{3} \frac{1}{2}$ in. and upwards oblong to linear 20-32-fld., glumes turgid. E. bifaria, Wall. Cat. n. 3827 D. F.; Duthie Grass. N.W. Ind. 36; Fodd. Grass. N. Ind. 61, t. 73; Griseb. in Goett. Nuchr. (1863) 76; Steud. Syn. Gram. 266.

OUTER HIMALAYA, from the Panjab to Nepal, up to 5500 ft. Behar, on Parasnath, and Chota Nagpore, Clarke, J. D. H.

Stems 12-18 in., densely tuited, filiform. Leaves as long as the stem or shorter. Spike 6-10 in., very slender, straight or subflexuous; rachis terete, smooth. Spikelets erecto-patent, close-set, laterally compressed, olive-green; empty gls. subequal or I slightly shorter, acutely keeled; II $\frac{1}{13}$ in. or less, obtusely keeled; flg. gls. nearly $\frac{1}{13}$ in., ovate, acute or subobtuse, nerves faint, keel smooth or nearly so. Anthers $\frac{1}{34}$ in. Grain $\frac{1}{10}$ in. or more, narrowly ellipsoid or subovoid, subterete or obscurely trienetrous, epicarp finely reticulate.

29. E. coromandelina, Trin. in Mem. Acad. Petersb. VI. i. (1831) 415; perennial, leaves 1-3 in. filiform convolute puberulous above, spikelets $\frac{1}{4-\frac{1}{2}}$ by $\frac{1}{12}$ in. oblong to linear 10-32-fld. Steud. Syn. Gram. 264. E. cretacea, Nees in Ann. Nat. Hist. i. (1838) 284. Poa coromandelina, Koen. ex Rottl. in Ges. Naturf. Fr. Berl. Neue Schrift. iv. (1803) 191; Roth. Nov. Pl. Sp. 71; Kunth Enum. Pl. i. 327. P. secunda, Roxb. Ic. pict. ined. t. 827.

PLAINS OF INDIA; from Rajputana to Behar, and southwards. Chota NAGPORE,

Wood. UPPER BURMA, Abdul Huk.

Stem 12-18 in., rather stout. Leaves short, rarely nat, spreading and recurved. Spike 4-8 in., interrupted; rachis slender, terete, smooth. Spikelets close-set, erecto-patent, laterally compressed, olive-grey or -green; empty gls. equal or I slightly shorter, acutely keeled; II $\frac{1}{13}$ in. or less, usually obtusely keeled; flg. gls. up to $\frac{1}{13}$ in., ovate, acute or subobtuse, nerves faint, keel smooth or nearly so; palen almost as long as its gl., keels sometimes obscurely winged scabrid. Stamens 3, anthers $\frac{1}{32}$ in. Grain $\frac{1}{30-36}$ in., shortly ellipsoid or subovoid, obtusely 3-quetrous, epicarp loosely reticulate.

30. **E. secunda**, Nees ex Steud. Syn. Gram. 264; perennial, leaves v-18 in. convolute or flat minutely puberulous above, spike very slender flaccid, spikelets \(\frac{1}{2} \) in. linear-oblong up to 10-fld., empty gls. unequal. E. bifaria, Thwaites Enum. Pl. Zeyl. 373 (excl. Syn.); Trim. Cat. Ceyl. Pl. 109.

CEYLON, ascending to 5000 ft., Walker, Thwaites (C.P. 60).

Spikelets secund or distichous, laterally compressed, olive-grey or straw-colrd.; empty gls. unequal, I about 1 in. acutely keeled; II 1 in., dorsally rounded; fig. gls.

in, ovate, acute; palea with rather narrow scabrid keels. Anthers γ_s^1 in, long. Grain almost $\frac{1}{2}$ in, elongate ovoid or ellipsoid, almost terete.—The materials for this species consist of only two specimens, one from Thwaites (C.P. 60), with leaves 6-7 in. convolute, erecto-patent; the other, from Walker, with much longer flat or subconvolute leaves 8-10 in. long.

31. **E. brachyphylla**, Stapf; perennial leaves $2\frac{1}{2}-4$ in. linear plicate glabrous above, spikelets $\frac{1}{4}-\frac{3}{4}$ in. oblong to linear about 20-fld., empty gls. subequal. E. bifaria, Wall. Cat. n. 3827 A. E. E. bifaria, β . minor, Wight & Arn. in Wight & Cat. n. 1773 C. & Herb. n. 3528, 3356. Poa secunda, Roxb. ex Wall. Cat. l. c. A. P. bifaria, Vahl, & P. coromandelina, Roth. ex Wight Cat. n. 1773b.

From BEHAR and the CENTRAL PROVINCES, southward to the Nilghiris, Wight, Perrottet.

Stem densely tufted, 10-18 in., slender. Leaves coriaceous, acute, rarely flat and $\frac{1}{10}$ in. broad. Spikes 3-6 in., slender. Spikelets close-set, usually secund, slightly compressed, olive-green; empty gls. up to $\frac{1}{13}$ in., I acute, acutely keeled; II obtuse, dorsally rounded; fig. gls. up to $\frac{1}{13}$ in., broadly ovate, obtuse, keel scaberulous below the tip; keels of palea narrow, scabrid. Anthers $\frac{1}{3}$; in. Grain $\frac{1}{50}$; $\frac{1}{3}$ in., shortly ellipsoid, obscurely triquetrous, almost terete, epicarp coarsely reticulate.

INDETERMINABLE SPECIES RECORDED AS INDIAN.

E. cernua, Steud. Syn. Gram. 266. Poa cernua, Willd. in Ges. Naturf. Fr. Berl. New Schrift. iv. (1803) 182.

E. confinis, Nees ex Steud. l. c. 265.

105. MYRIOSTACHYA, Hook. f.

A tall stout perennial glabrous grass. Leaves very long, flat. Spixelets 4-20-fld., racemed on the short branchlets of a narrow elongate panicle, pedicels jointed at the base; rachilla stout, flexuous, naked, at length jointed at the base and between the fl. gls. Glumes coriaceous, dorsally rounded, I and II very small, ovate, 1-nerved, keeled, long-awned; flg. gls. ovate, cuspidately acuminate, keeled, 3-nerved; palea coriaceous, as long as its gl., tip 2-toothed, keels close together stout scabrid-ciliate. Lodicules very minute, obliquely cuneate, retuse. Stamens 3, anthers very small. Ovary globose, styles united at the very base, stigmas long penicillate. Grain obliquely ovoid, obtuse, subterete, scutellum large.—Eragrostis, Sect. Myriostachya, Benth. in Journ. Linn. Soc. xix. (1881) 117.

M. Wightiana, Hook. f. Eragrostis Wightiana, Benth. in Hook. Ic. Pl. xiv. 62, t. 1381. Leptochloa Wightiana, Nees ex Steud. Syn. Gram. 209; Wight Cat. n. 1757. Dinebra verticillata, Wight ex Steud. l. c. Festuca natans, Ham. in Wall. Cat. n. 3823.—Eragrost. affine, Wall. l. c.

Marshes in the SUNDERBUNDS, Hamilton, Griffith, &c. S. INDIA? Herb. Wight.

Tenassemm, Helfer.

Stem 6-10 ft., densely tusted, erect from a stout sheathed scmetimes floating rootstock with long branching roots, as thick as the thumb at the base, smooth, simple or sparingly branched. Leaves several feet long, up to \(\frac{1}{2}\) in. broad, linear, finely acuminate, quite smooth; sheath very long, narrower than the blade, of lower leaves broad and compressed; ligule 0. Panicle 1-2 ft. by 2-3 in. broad; rachis quite smooth; branches 1-1\(\frac{1}{2}\) in., very many, crowded fascicled and whorled erecto-

patent, flowering to the base. Spikelets \(\frac{1}{4}\)-\(\frac{1}{2}\) in., 4-8-fld., compressed, quite smooth; pedicels short; gls. I and II unequal, keels scaberulous, awn \(\frac{1}{2}\) in. or more stiff stout.—In many respects Myriostachya is allied to Bragrostis cynosuroides, having a very similar inflorescence, and spikelets jointed on the branchlets of the panicle; but differs in the spikelets being pedicelled, in the long awned gls. I and II, and in its great size.

Var. longispicula; spikelets longer, up to \(\frac{1}{2}\) in. and 8-20-fld.—Penang, Curtis. Ceylon; at Kottiyar, Trimen.

106. HALOPYRUM, Stapf.

A tall stout perennial glabrous grass, with a branching creeping sheathed rootstock. Leaves narrow, rigid, convolute. Spikelets large, many-fld., sessile or shortly pedicelled on the short alternate branches of an elongate panicle, ovate, strongly laterally compressed, not jointed on their pedicels, nor are the pedicels on the branches; rachilla jointed at the base and between the flg. glumes, silkily hairy. Glumes many, closely distincted in bricate, dorsally rounded, coriaceous, keeled, I and II subequal, empty, ovatelanceolate, acuminate or apiculate; I 3-nerved, II 5-nerved; flg. gls. 6-10, rather shorter than the empty, mucronulate, 3-nerved; palea as long as the gl., subacute, 2-keeled. Lodicules 2, obcordate. Stamens 3. Styles short, free, stigmas elongate. Grain ellipsoid, compressed, deeply hollowed anticously, free.

H. mucronatum, Stapf in Hook. Ic. Pl. t. 2448. Brizopyrum mucronatum, Nees in Wall. Cat. n. 8898; Wight Cat. n. 2386. Desmazeria unioloides, Defl. Voy. Yemen, 220. Eragrostis mucronata, Trim. Cat. Ceyl. Pl. 109 (non Roem. & Sch.). Puniola mucronata, Linn. Sp. Pl. 104; Kunth Enum. Pl. i. 425; Steud. Syn. Gram. 281. Triticum repens, Thwaites Enum. Pl. Zeyl. 376.—Æluropus, Aitchie. Cat. Panjab Pl. 169.—Eragrostis sp. Sect. Sclerostachya, Benth. in Gen. Plant. iii. 1187.

Coasts of India from Sind to Cape Comorin and Tinnevelly. CEYLON, Gardner, &c.—DISTRIB. Westward to Arabia and E. trop. Africa.

Stem below creeping, as thick as a crow-quill, hard, smooth, woody, with strict vermiform roots, sending up rigid slender flowering stems 12-18 in. high, and shorter leafing ones. Leaves 8-12 in., flat or convolute, very narrow, wiry, glaucous, finely acuminate, glabrous, sheath terete, appressed, striate, hard, mouth villous; ligule a few hairs. Panicle 12-16 in., erect or inclined; brunches short with few spikelets and rachis quite smooth. Spikelets \(\frac{1}{2}\) in. long, sessile or shortly pedicelled, smooth, white or pale yellowish; rachilla very short, hairs half as long as the gls.; gl. I hardly longer than the lowest flg. gl., ovate-lanceolate, apiculate, 5-nerved towards the centre; II \(\frac{1}{2}\) longer, strongly 5-nerved.—There being no specimen of Uniola mucronata in Linnaus's Herbarium its citation here is doubtful.

107. COELACHYRUM, Necs. (See p. 8.)

108. DIPLACHME, Beauv.

Tall perennial grasses. Leaves flat or convolute, narrow. Spikelets many-fld., spicate on the slender simple branches of a tall simple panicle,

¹ This genus was erroneously supposed to be Indian when the Key was drawn up.

not jointed at the base; rachilla jointed at the base and beneath each fig. gl., not produced beyond the uppermost gl. Glumes many, I and II unequal, obtuse, membranous, I-nerved, persistent; fig. gls. rather longer, oblong, 1-3-nerved, tip 2-4-toothed, mucronate or awned; palea linear. Lodicules 2, broad. Stamens 3, anthers short. Styles distinct, stigmas plumose. Grain ovoid-oblong, subtrigonous, free within the gls. and palea.—Species about 14, of warm regions.

A second Indian species has lately been brought from Chitral, and will shortly be published by Dr. Stapf in the Kew Bulletin as D. (Iatacrei.

D. fusca, Beauv. Agrost. 163; tall, leaves convolute, panicle long, spikelets \(\frac{1}{2}\) in. linear 4-10-fld. Benth. Fl. Austr. d. vii. 619; Boiss. Fl. Orient. v. 561; Trim. Cat. Ceyl. Pl. 109. D. indica. Spreng. Syst. i. 351. Uralepis fusca, Steud. Syn. Gram. 247; Thwaites Enum. Pl. Zeyl. 372. U. Drummondii, Steud. l. c. Triodia ambigua, Br. Prodr. 183. Tridens indicus, Nees in Wight Cat. n. 1794. Leptochlon? fusca, Kunth Revis. Gram. i. 91, Enum. Pl. i. 271. Festuca fusca, Linn. Sp. Pl. 109; Del. Fl. Egypt. 24, t. xi. f. 1. F. indica, Retz. Obs. iv. 21; Kunth Enum. 412. F. reptatrix, Linn. Sp. Pl. Ed. II. 108; Kunth l. c. 410. Eragrostis procera, Steud. l. c. 266. Poa procera, Roxb. Fl. Ind. i. 332; Kunth l. c. 345. Bromus polystachios, Forsk. Fl. Eg. Arab. 23. Eragrostis. Wall. Cat. n. 5013.—Rheede Hort. Malab. xii. t. 45.

UPPER GANGETIC PLAIN to BENGAL and southward to CEYLON .- DISTRIB.

Egypt, Trop. Asia, Africa, and Australia.

Stem tufted, 3-5 ft., stout, erect, or geniculately ascending, often branched, clothed with leaf-sheaths. Leaves long, narrow, flat or convolute, smooth; sheaths smooth; ligule large, membranous, lacerate. Panicle 10-18 in., oblong, nodding; rachis smooth; branches 2-3 in., erect, filiform, smooth or scaberulous. Spikelets distant, very shortly pedicelled, pale or dark green; rachilla smooth or scaberulous; callus hairy; gls. I and II 1-nerved, tips erose, keels nearly smooth; I lanceolate; II \(\frac{1}{2}\) longer, oblong; flg. gls. thinly coriaceous, 3-nerved, lateral nerves submarginal, tip 4-toothed, mucronate by the percurrent median nerve.

109. MELICA, Linn.

Perennial erect grasses. Leaves narrow. Spikelets in open or spiciform or racemiform panicles, laterally compressed, jointed or not on their pedicels, 1-3-fld. and with small convolute neuter gls. forming a clavate o narrow body terminating and jointed on the elongate rachilla. Glumes 4 cr more, membranous, hyaline or with hyaline tips and margins; I and II equal or unequal, empty, I 1-3-nerved; II 5-nerved, persistent or separately deciduous; flg. gls. solitary, or 2-3 then distant on the rachilla, 5-9-nerved, lowest stipitate; palea 2-keeled. Lodicules 2, connate, often most minute or 0. Stamens 3. Styles free, stigmas plumose. Grain oblong fusiform or subcylindric.—Species probably 20 or 30, of temp. regions.

- * Panicle spiciform or racemiform; spikelets more or less jointed on their pedicels; lodicules most minute or 0.
- 1. M. Cupani, Guss. Fl. Sicul. Prodr. Suppl. 17; panicle subspiciform, fig. gl. solitary clothed all over with long silky hairs. Boiss. Fl. Orient. v. 590; Parlat. Fl. Ital. i. 301. M. ciliata, Duthie Grass. N.W. Ind. 39 (non Linn.). M. Jacquemontii, Decne in Jacquem. Voy. Bot. 174, 1. 175: Duthie l. c. M. Hohenackeri, Boiss. Diagn. Ser. I. xiii. 54. M.

micrantha, Boiss. & Heldr. var. inequalis, Griseb. in Goett. Nachr. (1868) 76. M. persica, Kunth Revis. Gram. i. 351, t. 89, Enum. Pl. i. 375, Suppl. 311; Ledeb. Fl. Ross. iv. 398; Duthie l.c.; Griseb. l.c. 76, 77. M. trachyantha. Boiss. Diagn. Ser. I. vii. 124.

WESTERN HIMALAYA; in the drier regions from Kumaon westwards, alt. 7-11,000 ft. Western Tiber, alt. 8-11,000 ft.—Distrib. Westwards to Spain and N. Africa.

Stems 8-18 in., densely tufted, creeping below, very slender. Leaves 2-8 in., very narrow, flat or convolute, and as well as the sheaths glabrous puberulous or tomentose with spreading or reflexed hairs; ligule oblong, short, or 0. Panicle 2-4 in.; rachis filiform, smooth; branches very short and pedicels scaberulous. Spikelets more or less secund, 1 in. long, subcrect or spreading, pale straw-colrd. or dark purple; rachilla glabrous, very short slender and geniculate below the fig. gl., stouter and strict beyond it, articulate beneath the neuter gls. Glumes all scaberulous, I 1-1 shorter than II, ovate, subacute, 1-3- rarely 5-nerved; II lanceolate, acute, 5-nerved; fig. gl. about as long as II, clothed with straight hairs nearly as long as itself that spread when dry, 7-nerved; pales oblong, 2-toothed, scaberulous, keels ciliolate; lower neuter gls. coriaceous, glabrous scabrid hispidulous or rarely sparsely hairy, usually obliquely clavate and truncate, rarely oblong, strongly nerved. Lodicules 0 or most minute. Grain fusiform .- A most variable plant, presenting, according to Boissier, eight varieties, and under which are ranged fourteen species of his own and other authors. The Indian specimens may be roughly classed under two very distinct-looking forms, which, but for Boissier's wider experience and authority, I should have been disposed to regard as species; though I find specimens which seem to be intermediate between them. These are, M. Cupani, Guss. (which includes trackyantha, Boiss.) with stems 12-18 in. high, pale straw-colrd. spikelets \(\frac{1}{4}-\frac{1}{2}\) in. long, with gl. II usually only about \(\frac{1}{2}\) longer than I; and M. persica, Kunth (including Jacquemontii, Decne.), with stems 6-12 in. high, purple (rarely pale yellowish) spikelets 1-1 in. long, and gl. II almost twice as long as I. In both the leaves or their sheaths or both, are glabrous or tomentose, and the club-shaped neuter gls. from nearly smooth to scabrid.

2. M. nutans, Linn. Sp. Pl. 66; panicle racemiform very lax, spikelets 2-fld., gls. I and II cymbiform very obtuse, III quite glabrous. Fl. Dan. t. 962; Host Gram. Austr. ii. 9, t. 10; Gærtn. Fruct. ii. 5, t. 80, f. 4; Schreb. Gram. ii. 62, t. 6, f. 2; Engl. Bot. t. 1059; Knapp Gram. Britt. t. 42; Kunth Enum. Pl. i. 376; Cav. Ic. t. 175; Reichb. Ic. Fl. Germ. t. 72; Steud. Syn. Gram. 291; T. Nees Gen. Fl. Germ. Monocot. i. n. 60; Ledeb. Fl. Ross. iv. 399; Boiss. Fl. Orient. v. 568.

KASHMIR, Falconer; at Hirpoor, alt. 8000 ft., Clarke.—DISTRIB. Europe, N. Asia.

Stem 10-18 in., very slender, inclined, from a long stoloniferous rootstock. Leaves 6-10 in., very narrow, acuminate, sparsely hairy; ligule very short or 0. Panicle long, nodding or drooping, rachis and few branches secund, capillary. Spikelets \(\frac{1}{2}\) in long, few, distant, very shortly pedicelled, pendulous, broadly oblong; gls. I and II subequal, scarious, green or purplish; III oblong, strongly many-nerved, scaberulous. Lodicules minute, connate. Grain fusiform.

- ** Panicle with spreading branches; spikelets not jointed on their pedicels; gl. I and II persistent; neuter gls. forming a small oblong body; lodicules 2, connate.
- 3. M. scaberrima, Hook. f.; branches of panicle elongate opposite alternate or 3-nate, spikelets 3-5-fid., gls. I and II ovate-lanceolate, fig. gls. narrowly lanceolate. Festuca scaberrima, Nees ex Steud. Syn. Gram. 316. Glyceria scaberrima, Steud. l.c.: Duthie Grass. N.W. Ind. 41. Poa Zizania, Jacquem. mes.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6-10,000 ft. Stem 3-5 ft., very slender, flaccid, smooth. Leaves 8-10 by \$\frac{1}{2}-\frac{1}{2}\$ in., more or less scabrid; sheaths scabrid, hirsute on the upper margins; ligule short, truncate, 2-auricled. Panicle very variable, rarely reduced to a subsimple raceme; rachis filiform; branches 2-5 in., at length horizontal, often 2 in. apart, smooth or scabrid. Spikelets often irregularly disposed, shortly pedicelled, crowded on short branchlets, or distantly scattered, \$\frac{1}{2}-\frac{1}{2}\$ in. long, pale green; rachilla slender, scaberulous; gl. I and II ovate-lanceolate, I 1-nerved; II 3-nerved; flg. gls. distant, lowest about twice as long as II, narrowly lanceolate, strongly 7-9-nerved, tip quite entire; palea shorter than its gl., keels scaberulous. Lodicules very minute. Anthers variable in length. Grain subcylindric or fusiform.—Closely allied to the Afighan M. secunda, Regel (M. gracilis, Aitch. & Hemsl.) a native of Afighan. and Turkestau.

Var. micrantha; spikelets ; in., leaf-sheaths nearly smooth, ligule hardly

auricled.-Kishtwar, alt. 6000 ft., Clarke.

110. LOPHATHERUM, Brongn.

Tall slender leafy perennial grasses. Leaves petioled, lanceolate, acuminate, nerves tessellate. Spikelets 1-fid., narrowly lanceolate, terete, solitary, secund and jointed on the long strict alternate branches of a lax panicle; rachilla not jointed at the base, produced beyond the fig. gl. and bearing several closely sheathing awned empty gls. Glumes dorsally rounded, I and II empty, oblong, obtuse, margins membranous, 5-nerved, decidnous with the fig. gl.; III much longer, coriaceous, ovate-oblong, 7-9-nerved, mucronate or shortly awned; keels of palea narrowly winged, smooth. Lodicules 0. Stamens 3. Styles connate at the base, stigmas long. Grain oblong, free.—Species 1 or 2, trop. Asia.

L. gracile, Brongn. in Duperr. Voy. Bot. 50, t. 8; Kunth Enum. Pl. i. 391; Steud. Syn. Gram. 300; Benth. Fl. Hongk. 433; Thwaites Enum. Pl. Zeyl. 374; Trim. Cat. Ceyl. Pl. 109; Miq. Fl. Ind. Bat. iii. 400. I. elatum, Zoll. & Mor. Syst. Verz. Zoll. 102. L. japonicum, multiflorum and dubium, Steud. Syn. Gram. 300. L. Lehmanni, Nees ex Steud. l. c. Acroelytrum japonicum, Steud. in Flora, xxix. (1846) 21. Allelotheca. Urvillei, Steud. Syn. Gram. 117.—Centothecæ affine, Wall. Cat. n. 8900.—Griff. Ic. Pl. Asiat. t. 152, f. 2.

TROPICAL HIMALAYA, from Sikkim castwards; the Khasia and Naga Hills, Burma, Crylon (up to 4000 ft.), and the Malaya Peninsula.—Distrib. China,

Japan, Malaya, N. Guinea.

Stem 2-5 ft., ascending from a branched woody rootstock. Leaves 4-10 by \(\frac{1}{2}-\frac{1}{4} \) in., narrowed into a slender petiole \(\frac{1}{2}-\frac{1}{4} \) in. long; sheaths smooth; ligule minute. Panicle of few distant strict stiff smooth branches, 6-18 in. long. Spikeless \(\frac{1}{2}-\frac{1}{4} \) in., including the short awns of the closely imbricate upper empty glumes, which form a pencil of short erect or spreading bristles projecting from the apex of the tightly rolled fig. gls.—It is remarkable that this plant has not been observed in the Deccan Peninsula.

DOUBTFUL SPECIES.

L. DUBIUM, Steud. Syn. Gram. 300.—Herb. Wight. n. 1090. The description is of leaves only, and quite unrecognizable.

111. CENTOTHECA, Desv.

Tall perennial grasses. Leaves broadly lanceolate, tessellately nerved. Spikelets 1-2-fld., secund on the long branches of a lax subsimple panicle,

not jointed on the very short pedicels; rachilla jointed at the base and between the fig. gls. Glumes 5, I and II oblong-ovate, keeled, 3-5-nerved, empty, persistent; fig. gls. oblong, acute, dorsally rounded, 7-nerved, naked or the upper bearing soft erect at length deflexed tubercle-based spines above the middle; palea shorter than the gl., keels ciliolate. Lodicules 0. Stamens 2-3, anthers short. Styles free. Grain ovoid, acute, terete, free.—Species 1 or 3?, Trop. Asia, Africa, Australia.

C. lappacea, Desv. in Nouv. Bull. Soc. Philom. ii. (1810) 189, & in Journ. Bot. i. (1813) 70; Beauv. Agrost. 69, t. 14, f. 7; Kunth Revis. Gram. i. 317, t. 70, Enum. Pl. i. 366, Suppl. 302; Steud. Syn. Gram. 116; Thw. Enum. Pl, Zeyl. 374; Trim. Cat. Ceyl. Pl. 109; Wall. Cat. n. 3826; Griff. Notul. iii. 62, Ic. Pl. Asiat. t. 152, f. 1; Miq. Fl. Ind. Bat. iii. 398; Benth. Fl. Austral. vii. 640; Hochst. in Bot. Zeit. (1857) 33; Lisboa in Journ, Bomb. Nat. Hist. Soc. vii. (1893) 388. C. latifolia, Trin. Fund. Agrost. 141. C. parviflora. Anderss. in Peters. Reise Mosamb. Bot. 559. Hierochloa? latifolia, Kunth Revis. Gram. i. 21. Holcus latifolius, Osbeck. Iter. 247; Linn. Syst. Ed. x. 1305. Oplismenus? magellanicus, Roem. & Sch. Syst. ii. 485. Melica lappacea, Rasp. in Ann. Sc. Nat. Ser. I. v. (1825) 443. M. diandra & refracta, Roxb. Fl. Ind. i. 327. Poa latifolia, Forst. f. Prodr. 8; Vahl Symb. ii. 18. P. malabarica, Linn. Sp. Pl. 69; Burm. Fl. Ind. 27. t. 11, f. 2. P. nemoralis, Heyne ew Wall. Cat. n. 3826 A. Torresia? latifolia, Beauv. l. c. 165. T. biflora, Roem. & Sch. Syst. ii. 515. Uniola lappacea, Trin. in Act. Petrop. VI. i. (1831) 358, Sp. Gram. Ic. t. 298. Cenchrus lappaceus, Linn. Sp. Pl. Ed. II. 1488. Festuca latifolia, Roth. Nov. Pl. Sp. 75. F. blepharophora, Roem. & Sch. Syst. ii. 728. F. ciliaris. Heyne ex Roem. & Sch. l. c. F. ciliata, Hb. Heyne ex Wall. Cat. n. 3826 A. F. virgata, Heyne ex Steud. Nom. Ed. II. i. 633. Panicum festuciforme, Hochst. Pl. Ind. Or. Hohenack. n. 363.—Panicum, Wall. Cat. n. 8708.

TROPICAL SIKKIM HIMALAYA, the KHASIA HILLS, MUNNIPORE, BURMA, CENTRAL INDIA, and southward to MALACCA, the ANDAMAN ISLDS., and CEYLON.—DISTRIB.

Malaya, China, Polynesia, Africa trop.

Stem 1-3 ft., stout, erect from a branched woody rootstock, with stout root-fibres. Leaves 4-10 by 1-14 in., many-nerved, glabrous or sparsely hairy, base narrow obtuse or subcordate, midrib oblique; sheath glabrous or hairy; ligule short, lacerate. Panicle 8-10 in. long and broad, branches smooth. Spikelets 1-4 im., green; rachilla scaberulous; palea often decurrent on the rachilla below the gl.—The number of fig. gls. varies, but 5 is, I think, a normal; I and II are rather distant at the base. In one spikelet I find 6 gls., of which III was empty naked and epaleate, IV naked and paleate, V and VI with stout reversed tubercle-based spines; not unfrequently the fem. spikelet has only a single strongly-armed gl. and a produced rachilla. Kunth (l. c. Suppl. 302) describes gl. III and IV as complete and bisexual, V minute and imperfect. I suspect that this grass is polygamous.

112. STREPTOGYNA, Beauv.

A tall erect pereunial grass. Leaves petioled, flat; nerves tessellate. Spikelets 1-4-fld., narrow, terete, subsessile, not jointed on the long, rigid, strict, unilateral spike; rachilla elongate and jointed between the fl. gls. Glumes 3-6, very narrow, I and II empty, persistent; I small, 3-nerved; II longer, convolute, acute, awnless, many-nerved; III longer, rigid, tightly convolute, many-nerved, acuminate and awned; IV-VI empty; palea embraced by the gl., narrow, 2-fid. Lodicules 3, subulate. Stamens

- 2-3. Styles filiform; stigmas 2-3, very long, at length spirally twisted. Grain linear, terete, tree but closely embraced by the gl. and palea.
- S. crinita, Beauv. Agrostogr. 80, t. 16, f. 8; Poir. Encycl. Suppl. t. 912; Kunth Enum. Pl. i. 427, Suppl. 349; Doellin Mart. Fl. Bras. ii. III. 171, t. 46; Steud. Syn. Gram. 339; Grisch. Fl. Brit. W, Ind. 528; Thw. Enum. Pl. Zeyl. 374; Trim. Cat. Pl. Ceyl. 110; Wight Cat. n. 2362. S. guianensis, Rich. ex Roem. & Sch. Syst. ii. 614. Streptia crinita & secunda, Herb. Rich.

TRAVANCORE; Courtallam, Wight, Beddome. CRYLON; Matele district, Gardner.

DISTRIB. Africa and America trop.

Stem 4-6 ft., smooth. Leaves often as long as the stem, lanceolate, gradually narrowed to the base and apex, membranous; sheath long, open; ligule short. Spikes terminal, 8-16 in. long, with a spathiform basal sheath; rachis compressed, smooth, produced beyond the spikelets, with often an imperfect glume. Spikelets 1 in., quite smooth and glabrous; gls. subcoriaceous; I lanceolate, finely acuminate; III narrowed into the very slender awn, \(\frac{1}{2}\)-\(\frac{7}{4}\) in. long. Anthers very long and narrow.

113. ÆLUROPUS, Trin. (ex parte).

Low much branched rigid leafy perennial grasses. Leaves distichous, usually spreading and convolute, rigid and pungent, rarely flat. Spikelets 6-many-fld., sessile or subsessile in oblong spiciform panicles or capitate, densely crowded, laterally compressed, villous, not jointed on their pedicels; rachilla jointed at the base and between the flg. gls. internodes very short. Glumes many, oblong, membranous, dorsally rounded, apiculate cuspidate or mucronate, I and II shorter than the flg. gls., I 1-3-nerved; II 5-7-nerved; fl. gls. closely imbricate, 7-9-nerved, longer than the empty gls.; palea as long and broad as its gl., broader upwards, truncate, keels ciliate. Lodicules 2, obliquely truncate. Stamens 3, anthers small. Styles free, stigmas plumose. Grain ovoid to oblong, free.—Species few, Reg. Mediter.. Oriental and Indian.

Parlatore (Fl. Ital. i. 462) has, under El. littoralis, pointed out that two plants have been referred to A. lævis, Trin., namely, Dactylis brevifolia, Koen., and D. littoralis, Willd. The former of these is an Indian species, on which alone Trinius founded the genus, the latter being subsequently referred to it by Steudel (Nom. Ed. II. i. 30); but Parlatore was not aware of D. brevifolia being a species of Eleusine, and that therefore Eluropus, Trin., has no foundation. That this is so is evidenced both by Trinius's citation of Koenig's plant by name as his lævis, and by his figure of the fruit (Agrost. Fund. t. 12), which is conclusive. It would, however, appear from C. A. Meyer (Verz. Pfl. Cauc. 18 (1831) that Trinius may have included both D. brevifilia and littoralis under his A. lavis; for that author, quoting no doubt from the St. Petersburgh Herbarium, cites levis and villosus as species of Trinius, giving (by error) D. littoralis as the authority for lanis, and Poa repens, Rieb., for villosus. Under these circumstances it appears to me that the best course to adopt, is to retain Eluropus as "Trin. ex parte," for D. littoralis and other plants described by later authors under that generic name. The alternatives are either to coin a new name for the latter, or to adopt for these Calotheca, Spreng. (Syst. i. 342 (1825), which is a mixture of several genera, including Eluropi, and which name is better avoided, inasmuch as there is an earlier Calotheca (Desv. 1810). likewise made up of several genera of grasses. It remains to say that the synonyms of Eleusine brevifolia (see p. 295), and of Æluropus littoralis and villosus are almost inextricably involved; and I am far from being satisfied with my attempt to disentangle the first and last of them.

E. villosus, Trin. ex C. A. Mey. Verz. Pfl. Cauc. 18; spikelets in short heads. Aitchis. Cat. Panjab. Pl. 169. Æ. arabicus, Steud. Nom. Ed. II. i. 30. Æ. brevifolius, Wall. Cat. n. 8897; Wight Cat. n. 1792 (non Herb. Wight & excl. Syn. Dactylis brevifolia, Linn.); Duthic Grass. N.W. Ind. 39. E. concinnus & siniacus, Fig. et Notar. in Mem. Acad. Torin. Ser. II. xii. (1852) 257. Æ. lagopodioides, Trin. ex Thw. Enum. Pl. Zeyl. 374. Æ. lagopoides, Trin. ex Trim. Cat. Ceyl. Pl. 110. Æ. littoralis, var. repens, Coss. & Dur. Expl. Sc. Alger. 155; Boiss. Fl. Orient. v. 594. E. mucronatus, Aschers. in Schweinf. Reitr. Fl. Ethiop. 297; Boiss. l. c. 595. A. niliacus, Steud. Nom. Ed. II. i. 30. A. niloticus, Edgew. in Journ. Linn. Soc. vi. (1862) 196. Æ. pubescens, Trin. ex Steud. l. c. in part ? Æ. pungens, C Koch. in Innnæa, xxi. (1848) 408. Æ. repens. Parl. Fl. Ital. i. 462; Edgew. l. c. Dactylis lagopodioides, Dalz. & Gibs. Bomb. Fl. 298 (excl. Syn.). D. lagopoides, Linn. Mant. 33; Burm. Fl. Ind. 28, t. 12, f. 2 (the right hand portion), Roxb. Fl. Ind. i. 340; Grah. Cat. Bomb. Pl. 236 (excl. Syn.). D. massaviensis, Steud. Syn. Gram. 298. D. repens, Desf. Fl. Atlant. i. 79, t. 15. Pos lagopodioides, Kunth Revis. Gram. i. 111, Enum. i. 325. P. massavensis, Fresen. in Mus. Senkenb. ii. (1837) 143. P. repens, Bieb. Fl. Taur. Cauc. iii. 69. P. tunetana, Spreng. Pugill. ii. 20. Calotheca arabica, niliaca & repens, Spreng. Syst. Veg. i. 347, 348. Duthie l.c. (err. typ. miliacea). Kœleria lagopodioides, Panz. in Denkschr. Acad. Muench. K. brevifolia, Herb. Wight ex Wall. Cat. n. 8897 C. Sesleria lagopodioides, Spreng. Pugill. ii. 22. Festuca mucronata, Forsk. Fl. Ægypt. Arab. 22. F. pungens, Vahl Symb. i. 10, t. 2. Uralepis? pungens, Kunth Revis. Gram. i. 108, Enum. i. 319.

Sandy shores of the DECCAN PENINSULA and CRYLON. Salt plains of the PANJAB

and SCIND .- DISTRIB. Reg. Mediterr., Arabia, Persia, Affghan., Reg. Casp.

A rigid perennial herb, with long wiry roots. Stems 6-12 in., densely tufted, branched, hard, smooth, erect, or prostrate with long often creeping stolous, base slightly swollen, clothed with rigid glabrous or hairy sheathing scales, above clothed with leaves, and terminating in a naked glabrous or pubescent slender peduncle 1-4 in. long. Leaves 1-1 in., erect or spreading and recurved, subulate-lanceolate or acicular, coriaceous, pungent; convolute, rarely flat, striated with close-set nerves, base rounded, glabrous or sparsely hairy, midrib obscure, margins smooth or scaberulous; sheaths short, terete, inflated or dilated, glabrous or ciliate; ligule a ridge of short hairs. Heads $\frac{1}{4}$ - $\frac{1}{3}$ in diam., globose ovoid or oblong. Spikelets $\frac{1}{16}$ - $\frac{1}{10}$ in., 4— many-fid., crowded, sessile, villous with soft hairs, pale green or white; gls. closely imbricate, ovate-oblong, apiculate, concave, margins hyaline, nerves strong: I 3-5-nerved; II longer, 7-9-nerved; fig. gls. rather longer than the empty, many-nerved, lower 2-4 sometimes neuter; pales broadly truncate or 3-lobed. keels villous. Ovary obovoid. Grain 10 in., obovate-oblong, compressed dorsally.-A very variable grass in habit, foliage and size of the heads and spikelets. Regarded by Cosson and others as a form of E. littoralis, in which the panicle is elongate.

114. DACTYLIS, Linn.

Stiff erect tufted perennial grasses. Leaves flat. Spikelets 3-10-fld. compressed, subdistichously crowded in short unilateral spikes forming a terminal unilateral panicle, not jointed at the base; rachilla continuous, glabrous. Glumes I and II unequal, scarious, lanceolate, acuminate or mucronate, keeled, empty, persistent; I 1-nerved, II 1-3-nerved; fig. gls. rather longer, rigid, 5-nerved, subaristate, keel scabrid; palea 2-fid, keels ciliolate. Lodicules 2, 2-lobed, fleshy. Stamens 3, anthers long. Styles free, terminal stigmas plumose. Grain oblong, acute, trigonous, dorsally subcompressed, ventrally channelled, glabrous.—Species few, Europe temp. Asia and Africa.

D. glomerata, Linn. Sp. Pl. 86; leaves keeled, sheaths compressed, ligule long laciniate, panicle erect or inclined, branches short or the lower long erecto-patent naked below, spikelets 3-5-fld., keels of flg. gls. ciliate-scabrid. Beauv. Agrost. 85, t. 17, f. 5; Fl. Dan. t. 743; Host Gram. Austr. ii. 67, t. 94; Kunth Enum. Pl. i. 386, Suppl. 320, t. 29, f. 1; Engl. Bot. t. 335; Knapp Gram. Britt. t. 62; Reichb. Ic. Fl. Germ. t. 59 (excl. f. 1520); T. Nees Gen. Fl. Germ. Monocot. i. n. 65; Webb. Phytog. Canar. t. 249; Wall. Cat. n. 8899; Duthie Grass. N.W. Ind. 39; Ledeb. Fl. Rost. iv. 355; Boiss. Fl. Orient. v. 596. Festuca vlomerata. All. Fl. Pedem. ii. 252.

NORTH-WESTERN HIMALAYA from Kashmir to Kumaon, and WESTERN TIBET, alt. 8-10,000 ft.—DISTRIB. Europe, N. Africa, W. and N. Asia (an alien elsewhere).

Stem 2-3 ft. from a short creeping stock, smooth. Leaves subglaucous, glabrous or hairy towards the base, margins scabrid; sheath much flattened or 2-edged. Panicle 1-6 in., strict, green or purplish; lower branches sometimes 2-3 in. long. Spikelets \(\frac{1}{6}\)-\(\frac{1}{4}\) in., ovate; gls. I and II pale with green nerves, subaristately acuminate, terminal fig. gl. sterile.—There are many synonyms of this common variable European plant, but the whole genus must be studied before the species can be disentangled.

115. SCLEROCHLOA, Beauv.

A small annual prostrate grass. Spikelets minute, 3-6-fld., compressed, biseriately crowded on the branches of a secund subspiciform panicle; rachilla thickened under the flg. gls. Glumes 5-8; I and II very unequal, membranous, concave, emarginate, empty, persistent, I 3-nerved; II 5-8-nerved, unequal-sided; fl. gls. larger, complicate, keeled, strongly 5-nerved, tip obtuse, margins hyaline; palea hyaline, 2-fid. keels spinulosely ciliate. Lodicules 2, hyaline, ovate, 2-4-toothed. Stamens 3. Styles short, free, stigmas plumose. Grain oblong, free, subconcavo-convex, glabrous, tip 2-fid.

S. dura, Beauv. Agrost. 98, t. 14, f. 4; Reichb. Ic. Ft. Germ. t. 50, Ledeb. Fl. Ross. iv. 367; Boiss. Fl. Orient. v. 635; Griscb. in Goett. Nachr. (1863) 293. Poa dura, Scop. Fl. Carn. i. 70; Host Gram. Austr. ii. 53, t. 73. Sesleria dura, Kunth Revis. Gram. i. 110, Enum. Pl. i. 323, Suppl. 278. Cynosurus durus, Linn. Sp. Pl. 72; Pollich Hist. Palat. i. 98, Fig. 1. Eleusine dura, Lamk. Illust. i. 203. Festuca dura, Vill. Hist. Pl. Dauph. ii. 94. Amblychloa dura, Link in Linnea, xvii. (1843) 399.

Kashmir Valley, alt. 5000 ft., Thomson.—DISTRIB. Europe, N. Asia.

Stems 4-6 in., tufted, compressed, leafy throughout. Leaves linear, acute; sheath open; ligule oblong. Paniele 1-2 in., ovate-oblong, rigid, green; pedicels very short, stout, trigonous. Spikelets \(\frac{1}{2}\)-1 in., spreading or appressed to the rachis; gel. I ovate-oblong, obtuse, keeled, margins hyaline; II twice as long; fig. gls. ovate-oblong, herbaceous, compressed above; palea shorter, oblong.

116. SCHISMUS, Beauv.

Small annual grasses. Leaves narrow. Spikelets many-fld., in a subspiciform panicle, with very short erect branches and pedicels, not jointed

at the base; rachilla elongate, jointed at the base and between the fig. gls. Glumcs 6-10; I and II large, empty, subequal, lanceolate, acute, concave, persistent, herbaceous, margins scarious, I coadest, 5-7-nerved; II 3-nerved; fig. gls. much shorter, eblong or obovate, 2-fid, many-nerved, mucronate or not between the hyaline lobes; palea spathulate with 2 submarginal diverging basal nerves. Lodicules 2, hyaline, truncate. Stamens 3, authers minute. Styles terminal, long, stigmas plumose. Grain minute, broadly obovoid, compressed, free.—Species 2 or 3, Europ. Asia, N. Africa.

S. marginatus, Beauv. Agrost. 74, t. 15, f. 4; Kunth Enum. Pl. i. 385, Suppl. 318, t. 28, f. 2; Ledeb. Fl. Ross. iv. 403; Duthie Grass. N.W. Ind. 39. S. calycinus, C. Koch in Linnwa xxi. (1848) 397; Coss. & Dur. Expl. Sc. Alger. 138, in Bull. Soc. Bot. Fr. iv. (1857) 399; Boiss. Fl. Orient. v. 599. S. hirsutus, Trin. Fund. Agrost. 148. Festuca calycina, Loegl. It. Hispan. 116; Cav. Ic. i. 88, t. 44, f. 2; Lamk. Illustr. t. 46, f. 5. Koeleria calycina, DC. & Duhy. Bot. Gall. Suppl. 271. Hemisacris gonatodes, Steud. in Flora, xii. (1829) 490. Electra calycina & nitida, Panz. in Muench. Denkschr. iv. (1813) 299 cum Ic. Trisetum Loeflingianum, Duthie Grass. N.W. Ind. 31 (non Beauv.).—Grift. Notul. 96 (gramen pusillum, &c.), Ic. Pl. Asiat. t. 154, f. ii.

UFPER PUNJAB; Peshawur, Stewart. WESTERN TIBET, alt. 9-11,000 ft., Nubra and Dras, Thomson, Iskardo, Clarke.—Distrib. Westwd. to the N. Atlantic, N. Asia.

Stems 2.8 in., densely tufted, filiform. Leaves glabrous or sparsely hairy, $\frac{1}{10}$ in. broad; ligule of hairs. Panicle $\frac{1}{2}$ -2 in., green, glistening, pedicels scabrid. Spikelets $\frac{1}{4}$ in.; gl. 1 and II glabrous; fig. gls. hairy, cleft to about $\frac{1}{4}$ of their length; lobes ovate, acute.

117. BRIZA, Linn.

Annual or perennial erect grasses. Leaves flat or convolute. Spike-lets many-fid., laterally compressed, pendulous, in lax rarely contracted or spiciform panicles not jointed on the pedicel; rachilla jointed at the base. Glumes many, scarious, cymbiform or saccate, closely imbricate; I and II subequal, empty, 3-5-nerved, persistent; fl. gls. broader, obtuse acute or shortly awned, 5- or more-nerved, terminal often empty or imperfect; palea often small, broad, flat, hyaline, 2-nerved. Lodicules 2, ovate-lanceolate. Stanens 3. Styles free. Grain ovoid, dorsally compressed, closely invested by the palea.—Species about 10, of temperate regions.

B. maxima, Linn., has been found as an escape in several parts of India. It may be recognized by the very large spikelets. B. minor, L., with very small spikelets may be also expected to occur.

B. media, Linn. Sp. Pl. 70; perennial, panicle erect, branches spreading, spikelets ovate 5-9-fld., gl. I and II shorter than III. Fl. Dan. t. 258; Host Gram. Austr. ii. t. 29; Knapp. Gram. Britt. t. 60; Engl. Bot. t. 340; Trin. Sp. Gram. Ic. t. 291; Reichb. Ic. Fl. Germ. i. t. 92; T. Neeg Gen. Fl. Germ. Monocot. i. n. 59; Kunth Enum. Pl. i. 371, Suppl. 307, t. 25, f. 2; Ledeb. Fl. Ross. iv. 365; Roiss. Fl. Orient. v. 502; Duthie Grass. N.W. Ind. 39.

WESTERN HIMALAYA; from Kashmir to Garwhal, and WESTERN TIBET, alt. 9-13,000 ft. SIKKIM, at Gnatong, Cummins.—DISTRIB. Europe, N. Asia. (An alien elsewhere.)

Stem 1-3 ft., very slender, creeping below and stoloniferous. Leaves flat, smooth or scaberulous; sheaths smooth, upper inflated; ligule short. Panicle pyramidal; branches long, capillary, horizontal. Spikelets \(\frac{1}{4}-\frac{1}{2}\) in., green or purplish, shining, orbicular-ovate; fl. gls. cordate, imbricate.

118. POA, Linn. (by O. Stapf).

Annual or perennial grasses. Leaves flat or convolute. Spikelets 2-6-fld., in lax or close rarely spiciform panicles, laterally compressed; rachilla jointed at the base and between the flg. gls., glabrous or sparsely hairy, upper fl. usually imperfect. Glumes 4 or more, acute or obtuse, usually thinly herbaceous; I and II empty, persistent, 1-3-nerved, keeled; flg. gls. obtuse or acute, 5-7-very rarely 3-nerved, nerves conniving towards the top, callus often bearded with long wool; palea shorter than the gls., 2-keeled. Lodicules 2. Stamens 3. Styles short, free, stigmas plumose. Grain ovoid oblong or linear, free or adherent to the palea.—Species about 80, temperate and cold regions, rarely tropical.

The Indian *Poae* have been worked up by Dr. Stapf, who has kindly given me his mss., from which the characters given below are taken. The nomenclature agrees closely with that of Hackel in a very extensive series of North Indian grasses collected by Mr. Duthie. The names of early distributed collections including those of Dr. Thomson and myself were given by Genl. Munro after a cursory examination, and should be disregarded.

Subgen. I. PSEUDOPOA, C. Koch. Fl. gls. 3-nerved, often very faintly.

1. P. persica, Trin. in Mem. Acad. Sc. Petersb. Ser. VI. i. (1831) 373; Kunth Enum. Pl. i. 358; Boiss. Fl. Orient. v. 610; Steud. Syn. Gram. 255. P. parvula, Herb. Un. Itin. ex Steud. l.c. P. pamphylica, Boiss. Dingn. Ser. I. xiii. 58. Nephelochloa persica, Griseb. in Ledeb. Fl. Ross. iv. 366, in Goett. Nachr. (1868) 74. Festuca persica, heptantha, & polygama, C. Koch in Linnæa, xxi. (1848) 409, 410. F. Amherstiana, Royle Ill. Himal. Bot. 417 (name only).—Poa, n. 19, 29, Herb. Ind. Or. H. f. & T.

WESTERN HIMALAYA; from Kunawur to Kashmir and WESTERN TIBET, alt.

7-12,000 ft.-Distrib. Westwd. to Asia Minor, Soongaria, Altai Mts.

A very slender erect, quite glabrous, usually flaccid annual, 1-18 in. high, most variable in habit; from a simple capillary stem with feed. It contracted paniele, to a tall strict herb, with a pyramidal or oblong copiously branches the paniele 6-8 inches long, and sometimes 6 in across the spreading branches. Leaves narrowly linear, rarely \(\frac{1}{2} \) in. diam., quite smooth, flat; ligule lanceolate. Paniele-branches 2-9 in a whorl, pedicels capillary, often very long and divaricate. Spikelets \(\frac{1}{10} - \frac{1}{2} \) in. long. 2-15-fld., green, rachilla slender; gls. I and II lanceolate, accuminate, I very small, II 3-nerved; fig. gls. longer than II, linear-oblong, acute acuminate or obtuse and mucronate, amooth or obscurely puberulous, tip and margins more or less broadly scarious and shining; palea 2-toothed, keels scaberulous. Lodicules ovate-oblong. Anthers minute. Grain narrow, linear, subadherent.

The following are divergent forms with many intermediates of this extremely variable grass. In India they do not seem to affect special localities. All seem to

occur in Western Tibet, where the plant is very abundant.

P. PERSICA proper; rather tall, spikelets many-fld., fl. gls. acute or semminate

very narrowly scarious.

Var. soongarica; spikelets 1-3-fld., flg. gls. acuminate, margins broadly scarious. var. oxymeris, Boiss. Fl. Orient. l. c. P. soongarica, Boiss. l. c. 611. P. paradoxa & P. subtilis, Kar. & Kir. in Bull. Soc. Nat. Misc. (1841) 464, (1842) 532. P. diaphana (error for diaphora), Trin. in Bull. Sc. Acad. Petersb. i. (1836) 69.

Nephelochloa altaica & soongarica, Griseb, in Ledeb, Fl. Rose, iv. 367. Glyceria soongarica, Schrenk in Fisch. & Mey. Enum. Pl. Schrenk. i. 1. Aira altaica, Trin.

in Bunge Verz. Suppl. Fl. Altaic. 8.

Var. alpina, Boiss. l. c. 610; 1-2 in. high, fastigiately branched, panicle depressed amongst the leaves, rachis short, branches crowded spreading subsquarosely and decurved, spikelets 2-3-fld. fl. gl. acute. Vur. minor, Boiss. in Bourg. Pl. Lycia (1860).

Var. major, Boiss. l.c.; tall, panicle spreading, spikelets few or many-fld., flg. gls. truncate or rounded at the tip mucronate, margins very narrowly scarious. Nephelochloa tripolitana, Boiss. & Blanch. Diagn. Ser. II. iv. 133.

Subgen. II. Euroa. Flg. gls. 5-nerved, lateral pairs sometimes obscure.

- * Stem bulbously thickened at the base.— Arenariae.
- 2. P. bulbosa, Linn. Sp. Pl. 70, var. elanata, Stapf; densely tufted. leaves linear acute flat, ligule ovate or oblong, panicle oblong, lower branches binate, spikelets 1-1 in. 4-7-fld. subsessile crowded often viviparous, gl. I ovate acute margin broadly hyaline, fig. gls. oblong acute, upper $\frac{1}{2} - \frac{1}{6}$ hyaline silkily hairy below the middle, nerves obscure, wool 0 or very scanty, keels of palea scabrid. P. bulbosa, Duthie Grass. N.W. Ind. 40: Griseb. in Goett. Nachr. (1868) 74.

WESTERN HIMALAYA; from Kashmir to Zanskar, alt. 5-9000 ft., Falconer. &c. WESTERN TIBET, alt. 9-13,000 ft. - DISTRIB. (of P. bulbosa) temp. Europe and Asia.

- Stems 6-16 in., terete, smooth. Leaves chiefly subradical, margins smooth, shortly soute, lower 2-24 in., upper much shorter, in. broad, of the surculi very narrow; sheaths lax, often open, upper more appressed shorter than the internodes; ligule 1-1 in., or shorter in reduced forms. Panicle 1-2 in., rarely ovate, lobed, contracted, lower branches nearly smooth; branchlets short, scaberulous. Spikelets shortly pedicelled or subscasile, oblong or ovate-oblong, pale green; gl. I 1 -1 in., ovate, acute, 3- rarely 2-nerved, margins denticulate, nerves rough; II similar but larger, more acuminate, 3-nerved; fl. gls. 1-1 in., oblong, acute, sometimes mucronulate, upper 1-1 hyaline; nerves obscure; palea 1 shorter. Anthers 1 1-13 in.-Differs from typical bulbosa in the absence or scantiness of wool in the spikelets. Kashmir specimens are unusually tall and stout, with many broad leaves and sometimes a laxer habit. Zanskar ones are typical in all respects but the absence of wool The viviparous state is very common.
 - ** Stem not bulbously thickened at the base.
- + Spikelets broadly ovate; gls. thin, broad, dorsally strongly arched, fl. gl. base silkily hairy, wool 0.—§ Alpinæ.
- 3. P. alpina, Linn. Sp. Pi. 67; densely tufted, surculi clothed with short distictions thickish sheaths, leaves short broadly linear firm acute. panicle broadly ovate, lower branches mostly binate, spikelets 1-1 in. 3-6fld. broadly ovate, gls. all thin arched, I ovate acute margin broadly hyaline, fig. gls. ovate-oblong obtuse upper & hyaline silky-hairy below the middle nerves obscure, wool 0, keels of palea ciliate below the middle. Host Gram. Austr. ii. 49, t. 67; Engl. Bot. t. 1003; Knapp Gram. Britt. t 50; Reichb. Ic. Fl. Germ. t. 83; Ledeb. Fl. Ross. iv. 370; Boiss. Fl. Orient. v. 605 : Griseb. in Goett. Nachr. (1868) 74 ; Duthie Grass. N.W. Ind. 40.

WESTERN HIMALAYA and WESTERN TIBET; from Kashmir to Garwhal, alt. 10-16,000 ft. - DISTRIB. N. temp. and Arctic regions.

Stem 4-16 in., terete, smooth. Leaves chiefly crowded at the base of the stem : rarely more than 1 in, broad, flat or of the surculi plicate, firm, margins rough; lowest sheaths and of the surculi distichous, the thickened bases enclosing the stem, upper

much longer, up to 2-4 in., smooth, open or not, uppermost remote from the paniele: ligule of the lower and of the surculi very short, truncate, ciliolate, of the upper longer, ovate, sparingly coarsely denticulate: Panicle up to 21 by 2 in., lax or dense, lower branches more or less spreading, usually naked in the lower half; branchlets short, scaberulous. Spikelets crowded, usually parti-coloured, the lower shortly upper longer-pedicelled; gls. thin, I \(\frac{1}{2} \) in., 3-nerved, lateral nerves faint or one obsolete, margins subentire, keel rough; II similar, but rather broader; fl. gls 1-1 in., often emarginate; palea hardly shorter, keels ciliate below the middle, serrulate above it. Anthers $+_{\kappa}$ in., oblong.

- ++ Spikelets narrower, gls. all or fig. especially firmer, I and II lanceolate or oblung-lanceolate.
- a. Gls. all firm; I & II acute or subacuminate, I 1- or sub 3-nerved; anthers 18 18 in.—Rather tall robust or subrobust species, stoloniferous when flg.; stems smooth.—§ Pratenses.
- 4. P. tibetica, Munro et Duthie Grass. N.W. Ind. 41; tall, stout. stoloniferous, leaves linear acute firm, ligule short truncate, panicle contracted or spiciform, lower branches 2-4-nate unequal smooth, spikelets 1 in. 4-6-fld. pedicelled crowded pale, gl. I ovate-lanceolate margin hardly hyaline, II ciliate on the margins towards the base, fl. gls. oblong. tips only hyaline, keel alone silkily hairy, lateral nerves obscure, wool 0.

WESTERN TIBET, alt. 9-16,000 ft.; Piti, Jacquemont; saline plains of Ladak. &c., Thomson. PLAINS OF TIBET N. of Kumaon, alt. 15,000 ft., Strachey & Winterbottom (Poa, n. 1.)

Stem 12-20 in., stout, terete, smooth, closely sheathed below, 1-2-leaved much below the panicle. Leaves, lower 8 in., upper 2-3 by 1-1 usually plicate, glabrous, smooth; sheaths firm, upper very long, smooth; ligule 11 in., firm, ciliolate. Panicle about 11 in. long, narrow, interrupted; lower branches 2-nate, the longer appressed to the rachis, and branchlets smooth. Spikelets crowded, all pedicelled, oblong, pale; gls. firm, I 1-1 in., subacuminate, sub 3-nerved, keel minutely scaberulous, margins hardly hyaline; II rather larger, more oblong; fl. gls. 1-1 in., subacute, ciliate on the margin towards the base, lateral nerves obscure; palea

rather shorter, keels subserrulate. Anthers $+_{3}$ in., linear.

Var. aristulata, Stapf; gls. more acuminate often very shortly aristulate.—
Eastern Tibet, N. of Sikkim, alt. 16-17,000 ft.—J. D. H.

5. P. pratensis, Linn. Sp. Pl. 67; tall, stout, stoloniferous, leaves usually flat acute upper much the shortest, ligule truncate or subobovate. panicle ovate or oblong lower branches usually 5-nate, spikelets 1-1 in. 3-5-fid. ovate acute crowded green, gl. I ovate-lanceolate acute, fig. gls. oblong upper 1-1 hyaline nerves prominent, keel and lateral nerves silkily hairy to the middle or above it, wool copious, keels of palea scabrid-serrate.— Host Gram. Austr. ii. 44, t. 61; Engl. Bot. t. 1073; Knapp Gram. Britt. t. 55; Kunth Enum. Pl. i. 352, Suppl. 297; Steud. Syn. Gram. 251; Reichb. Ic. Fl. Germ. t. 88; T. Nees Gen. Fl. Germ. Monocot. i. n. 56; Ledeb. Fl. Ross. iv. 378; Boiss. Fl. Orient. v. 601; Griseb. in Goett. Nachr. (1868) 74; Duthie Grass. N.W. Ind. 40. P. alpina, Griseb. l. c. (Herb. Schlagintw. n. 2772.)

WESTERN HIMALAYA; from Kashmir to Kumaon, and Western Tiber, alt.

5-15,000 ft. BHOTAN, Griffith .- DISTRIB. North temp. regions.

Stems 6-20 in., smooth, terete. Leaves crowded at the base of the stem, linear, rarely plicate or subinvolute, firm (flaccid in shade), margins asperulous, glabrous or rarely sparsely hairy, lower very variable in length, upper 1-1 in. by 10-2 in.; lowest sheaths firm, close; upper much longer, 4 in. and upwards, smooth; ligule rarely more than $\frac{1}{13}$ in. Paniele up to $\frac{1}{3}$ in., lax or contracted; lower branches rarely 2-3-nate, erect or spreading, naked below or rarely branched to the base, smooth or asperulous. Spikelets shortly or terminal longer-pedicelled, green; gl. I $\frac{1}{13}$ $\frac{1}{10}$ in., 3- or 2-1-nerved, keel asp-rulous, margins hyaline denticulate; II rather larger, 3-nerved; gls. $\frac{1}{3}$ $\frac{1}{3}$ in., acute, nerves prominent; palea shorter. Anthers $\frac{1}{13}$ $\frac{1}{13}$ in. linear.—
There are many forms, characterized by narrow almost setaceous or by very short leaves, by very narrow and contracted panieles, by shorter spikelets, or by various combinations of these characters; but these are all so intricately connected, and in many cases so evidently the product of conditions of habitat, and are so independent of geographical distribution, that it is impossible to define them satisfactorily. The two extreme forms are—

Var. angustifolia, Sm. Fl. Britt. i. 105; Gaud. Agrost. Helvet. i. 214; leaves extremely narrow often setaceous. P. angustifolia, Linn. Sp. Pl. 67. P. strigosa, Hoffm. & setacea, Hoffm. P. compressa & trivialis (in part) Herb. Ind. Or. Hf. & T.

-Occurs with the type and passes directly into it.

Var. alpigena, Blytt Norg. Flora, 130; stem 3-8 in., leaves short plicate, ligule $\frac{1}{3}$ in., panicle $\frac{3}{4}$ -1\frac{1}{4} in. ovate, lowest branches solitary or 2-5-nate glabrous more or less flexuous spreading sometimes deflexed, branches sparingly asperulous or glabrous, spikelets 3-2-fid. variegated. P. bulboss, Herb. Strack. F. Winterb. n. 4. P. variegate, Jacquem. mss. P. alpina, Herb. Ind. Or. Hf. F. T. (in part).—Western Tibet, alt. 13-17,700 ft., Topidhunga in Kumaon, alt. 14,500 ft., Strack. F. Winterb.—A very distinct variety, with the habit of P. alpina, and confounded with it in various collections.

6. P. pseudo-pratensis, Hook. f.; stem tall stoloniferous, leaves acute or acuminate usually plicate lowest usually shortest, ligule ovate acute or truncate, panicle ovate or oblong lax-fid. lower branches usually binate branches very long flexuous scaberulous, spikelets 1-1 in. 3-2-fid., gl. I ovate-oblong acute margin hardly hyaline, fig. gls. oblong tips alone hyaline base silkily hairy nerves prominent, wool scanty or 0, keels of palea ciliate below.—Festuca, Wall. Cat. n. 3798 (partly). P. pratensis & P. flexuosa? Herb. Ind. Or. Hf. & T. (in part.)

CENTRAL & EASTERN HIMALAYA; Nepal, Wallich; Sikkim and W. Bhotan,

alt. 10-12,000 ft., J. D. H., Cummins.

Stems 8-20 in., smooth, terete. Leaves crowded at the base of the stem, 1-3½ by ½ in., lowest shorter, cauline far distant, of the surculi longer, linear, gradually narrowed into the sheath, glabrous smooth or minutely scaberulous; lowest sheaths short, firm, scarious, loose, upper much longer up to 6 in., membranous, smooth; ligule $\frac{1}{15}$ in. Panicle up to 8 in., branches 3-5-nate, about 2-3 in. long, naked except towards the ends, all spreading or suberect, flexuous, smooth or asperulous, branchlets rough. Spikelets $\frac{1}{4}$ - $\frac{1}{3}$ in., blueish, crowded, shortly or the terminal longer-pedicelled, ovate-oblong; rachilla pilose; gls. firm, I $\frac{1}{4}$ in., 1-nerved, with rarely a lateral pair, keel roughish, margins minutely denticulate; II rather larger, more acuminate; fl. gls. $\frac{1}{4}$ - $\frac{1}{3}$ in., oblong, acute, tip spotted with yellow, keel and outer nerves silky beyond the middle, intermediate at the base only; palea rather shorter, ciliate below, and scabridly serrulate above or in the whole length. Anthers $\frac{1}{15}$ - $\frac{1}{15}$ in., linear.

- β . Glumes all, or the fig. especially somewhat firm, I & II acuminate, I always distinctly 3-nerved; anthers $\frac{1}{2},\frac{1}{12}$ in.—Low or more often tall slender species, stems when flowering surrounded by buds or short stolons, or fascicled with longer stolons.—§ Nemorales.
- 7. P. attenuata, Trin. in Bunge Verz. Suppl. Fl. Alt. 9; stems tufted erect rigid 1-2-leaved above, leaves narrowly linear plicate or involute, sheaths white scarious, ligule ovate, panicle contracted dense-fld., lower branches solitary or 2-nate short appressed scaberulous branching from

the base, spikelets $\frac{1}{6-5}$ in. 2-5-fid. subsessile, gl. I ovate-lanceolate acuminate margins narrowly hyaline, fig. gls. sparsely hairy below, wool 0 or scanty. Ledeb. Fl. Ross. iv. 371; Boiss. Fl. Orient. v. 608. P. attenuata & P. altaica, Griseb. in Goett. Nachr. (1868) 74. P. laxa, Duthie Grass. N. W. Ind. 40. P. laxa & trivialis partim Herb. Ind. Or. Hf. & T. P. flexnosa γ. humilis, Herb. Royle. P. sterilis, Bieb. ex Duthie l. c.

ALPINE HIMALAYA & WESTERN TIBET, alt. 13-17,000 ft.—DISTRIB. Persia, Turkestan, N. Asia.

Stems 4-6 in., densely tufted, not stoloniferous, bearing axillary surculi. Leaves 1-2 by $\frac{1}{15}$ in., firm, smooth or nearly so; lower sheaths mostly scarious, white, upper up to 2 in.; ligule $\frac{1}{12} + \frac{1}{12}$ in., acute. Panicle $\frac{3}{2} - \frac{1}{2}$ in., strict, continuous or sub-interrupted, lower branches rarely 3-nate, $\frac{1}{2} - \frac{3}{2}$ in., erect, often stout. Spikelets green, often variegated; gls. close together, firm, I hardly $\frac{1}{2}$ in. 3-nerved, keel nearly smooth or roughish; II rather longer, broader in the middle; fig. gls. $\frac{1}{3}$ in., oblong, upper $\frac{1}{6}$ hyaline, minutely scaberulous, tip usually erose; nerves 5, slender, obscure, keel and outer nerves silky at the very base only or subglabrous, rarely with longer hairs; palea rather shorter, keels serrulately scabrid. Anthers $\frac{1}{16}$ in.—Grisebach's P. altaica (Goett. Nachr. l. c.) is a stunted depauperate form.

8. P. nemoralis, Linn. Sp. Pl. 69; stem not stoloniferous when fig., but bearing at the base surculi or leaf-buds 2-4-leaved above the base smooth or scaberulous, leaves very narrowly linear, ligule very short ovate or longer and oblong, panicle contracted or open, lower branches usually binate usually branching to the base and branches scaberulous, spikelets $\frac{1}{8} - \frac{1}{8}$ in. long-pedicelled 2-4-fid., gls. crowded I ovate-lanceolate acuminate margins hyaline, fig. gls. oblong upper $\frac{1}{8}$ or $\frac{1}{8}$ hyaline nerves obscure and keel at the base silky-hairy, wool 0 or scanty, keels of palea scaberulous. Fl. Dan. t. 709; Engl. Bot. t. 1265; Host Gram. Austr. ii. 5, t. 71; Reichb. Ic. Fl. Germ. t. 86; Steud. Syn. Gram. 251; Ledeb. Fl. Ross. iv. 375; Boiss. Fl. Orient. v. 607; Duthie Grass. N.W. Ind. 40.

TEMPERATE & ALPINE HIMALAYA & WESTERN TIBET, alt. 5-15,500 ft.—

DISTRIB. Europe, N. Asia, N. Am.

Stem 1-2 ft., erect, rigid or flaccid, smooth or scaberulous above, lower internodes hidden in the sheaths or nearly so, uppermost more or less exserted. Leaves cauline 2-5 by \(\frac{1}{3} \) in., flat pli are or involute, firm or flaccid, erect or spreading, smooth or minutely scaberulous above; sheaths appressed, uppermost up to 4 in.; ligule truncate, up to \(\frac{1}{2} \) in., often erosely denticulaise. Panicle lax, rigid flexuous or flaccid, lowest branches solitary to 3-nate, slender, erect or spreading, asperulous. Spikelets loosely disposed, green or variegated; rachilla smooth scaberulous or pilose; gls. close or rather distant, firm or rather thin, I \(\frac{1}{3} - \frac{1}{3} \) in., 3-nerved, keel roughish, margins narrowly or broadly hyaline; II rather longer and broader; flg. gls. \(\frac{1}{3} \) in., subobtuse (or subacute in profile) upper \(\frac{1}{2} - \frac{1}{3} \) hyaline and sometimes erose, nerves 5, slender, interspaces sometimes puberulous; pulea rather shorter. Anthers \(\frac{1}{3} - \frac{1}{3} \) in.—An extremely variable species in habit and length of ligule especially, which is usually short in European examples. The form with a long ligule forms a link with P. attenuata, Trin., which has usually a more contracted habit. Most of the described varieties of nemoralis are also Indian.

Var. Linnæi, Stapf; ligule very short about 1 in. long.—From Kashmir to

Kumaon, alt. 5-9000 ft., rarely higher.

Var. ligulata, Stapf; ligule elongate 1 in. P. attenuata, Griseb. in Goett. Nachr. (1868) 75. (Schlagintw. n. 2791) & P. botryoides (Schlag. 7068, 7196). P. flexuosa, Herb. Royle, & Strack. & Winterb. n. 7. P. laxa, Herb. Ind. Or. Hf. & T. (the Sikkim plant). P. serotina, var. botryoides, Griseb. l. c. (Herb. Schlag. n. 7562). P. variegata, Jacquem. mss. (partim).—From Kashmir to Sikkim, alt. 7-15,000 ft.

- γ. Glumes all thin, I & II acute or subacute, I 1-nerved or with a very slender 2nd; anthers \(\frac{1}{3}\)-\frac{1}{6}\) in.—Stem slender, densely cospitose with fascicled basal surculi, or more loosely & stoloniferous; panicle slender, branches capillary.—6 Glareosæ.
- 9. **P. polycolea**, Stapf; stems fascicled wiry smooth, leaves narrowly linear or subsetaceous, lower sheaths very lax white scarious, ligule very short, panicle contracted or effuse, lower branches 2-5-nate capillary, branchlets and pedicels long, spikelets $\frac{1}{2}-\frac{1}{4}$ in loosely 3-fid, gl. I acute or subacute margins hyaline, fig. gls. oblong upper $\frac{1}{2}-\frac{1}{4}$ hyaline, nerves and keel sparsely silky hairy or glabrous, keels of palea minutely scabrid. P. serotina, Herb. Strach. & Winterb. n. 11. Poa n. 15, Herb. Ind. Or. Hf. & T.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8-12,000 ft.

Stem 6-12 in., erect or ascending, rather strict, lowest internodes loosely sheathed, uppermost rather far exserted. Leaves lower 8 in., long-acuminate, flat or more or less convolute, subflaccid, glabrous, smooth or margins and nerves beneath asperulous; uppermost sheaths up to $3\frac{1}{4}$ in. Panicle $2\frac{1}{4}-4$ in., pyramidal, rigid or flaccid, lowest branches 2-3 in., flexuous, lower $\frac{1}{4}$ or $\frac{1}{4}$ naked, then loosely branches; branches rather long, roughish; pedicels of spikelets up to $\frac{1}{4}$ in. Spikelets loosely disposed, oblong, bright green or variegated; gls. thin, I $\frac{1}{8}-\frac{1}{6}$ in., lanceolate, 1-nerved, keel roughish; II longer, obloug, 3-nerved; fig. gls. $\frac{1}{4}-\frac{1}{6}$ in., acute or subacute; nerves slender, prominent or obscure, outer and keel glabrous or sparsely silky; wool 0 or hardly any; palea rather shorter. Lodicules unequally 2-lobed. Anthers $\frac{1}{14}$ in., linear.

10. **P. Falconeri**, *Hook. f.*; stem tall leafy, leaves narrowed from the middle scaberulous above and beneath, upper equalling or exceeding their sheaths, ligule ovate, panicle narrow very lax, lower branches binate, spikelets $\frac{1}{2}-\frac{1}{4}$ in. 2-3-fid., gl. I oblong-lanceolate acute, II subobovate-oblong, fig. gls. acute or subacute tip shortly hyaline, nerves obscure sparingly pubescent, wool 0, keels of palea finely serrulate.

WESTERN HIMALAYA, Falconer; Garwhal, alt. 12-13,000 ft. Duthie (n. 288).

Stem 2-2½ ft., erect, smooth, terete, 4-5-leaved above the base; internodes short, or the upper more or less elongate and exserted. Leaves about 6 by $\frac{1}{6}$ in., subflaccid, linear, glabrous, flat or subplicate, upper about equalling their sheaths; lower sheaths lax, upper adpressed, firm, uppermost 3-6 in.; ligule $\frac{1}{13}$ — $\frac{1}{6}$ in. Pasicle about 4 in., narrow, very lax, flexuous and flaccid; lower branches flexuous, erect, sparingly and loosely again branched, smooth or nearly so, branchlets roughish. Spikelets as long as or shorter than their pedicels, oblong, green or purplish below, gls. thin, $\frac{1}{6}$ — $\frac{1}{6}$ in., 1-nerved argin broadly hyaline, keel minutely asperalous; II rather longer, 3-nerved; flg. gls. $\frac{1}{6}$ in., oblong, nerves very slender, pilose on the side at the base only; palea rather shorter than the gl. Lodicules unequally 2-fld. Asthers about $\frac{1}{10}$ — $\frac{1}{6}$ in.

11. P. flexuosa, Wahlb. Fl. Carp. 22, Fl. Succ. 57 (ex parte); stems usually very slender tuited stoloniferous, leaves narrowly linear acute or acuminate flat plicate or involute, cauline sometimes deflexed, panicle pyramidal lax, lower branches 2- rarely 3-nate or solitary, branches and pedicels scaberulous, spikelets \(\frac{1}{3}\)-\frac{1}{3}\) in 2-3-fld., gls. thin I oblong-lanceolate 1-3-nerved margin broadly hyaline, II rather longer, fl. gls. broadly oblong upper \(\frac{1}{2}\) or \(\frac{1}{3}\) hyaline base shortly silky-hairy, nerves obscure or slender and prominent, wool scanty or 0, keels of palea scabrid. Reichenb. Ic. Fl. Germ. t. 84; Blytt Norg. Fl. 126. PP. cenisia, Duthie Grass. N.W. Ind. 40; PGriseb. in Goett. Nachr. (1868) 75. P. cenisia, var. \(\beta\). flexuosa, Hartm.

Handb. Skand. Fl. 262; Anders. Gram. Skand. t. 4, f. 41. P. flexuosa, var. a. effusa, Herb. Royle.—Poa No. 9, Herb. Strack. & Winterb.—Poa No. 7, & P. flexuosa (of Sikkim), Herb. Ind. Or. Hf. & T.)

ALPINE HIMALAYA, alt. 10-17,000 ft., from Kashmir to Sikkim. - DISTRIB. N.

temp. and Arctic regions.

Stem 8-16 in., erect or with the branches geniculately ascending, smooth; lowest internodes short, laxly or closely clothed with short sheaths, the following 2-4 elong-te, uppermost exserted. Leaves 2-5 by $\frac{1}{30}$ in., glabrous, smooth or nearly so, flaccid or rather firm; lower sheaths scarious, uppermost about 4 in.; ligule $\frac{1}{13}$ — $\frac{1}{6}$ in., ovate. Panicle 2-4 in., erect or inclined; lower branches capillary, flexuous, often spreading or deflexed, naked except towards the tips smooth. Spikelets shortly or the terminal longer pedicelled, green, generally suffused with purple; gl. I $\frac{1}{6}$ — $\frac{1}{7}$ in., sub-obtuse or -acute, margins broadly hyaline, keel smooth or roughish; II rather longer, ovate-oblong, sub-obtuse, 3-nerved, lateral nerves often short; flg. gls. $\frac{1}{6}$ — $\frac{1}{7}$ in., nearly glabrous or keel and nerves at the base silky, smooth or minutely rough; palea rather shorter than the gl., dorsally most minutely puberulous between the keels. Anthers $\frac{1}{7}$ = $\frac{1}{6}$ in., linear.

- 8. Glumes I & II thin, acute or acuminate, I 1-nerved, or with a very slender 2nd, rarely 3-nerved; anthers very minute; rarely $\frac{1}{16}$ in. long.— Usually perennial, sometimes fig. in the first year, or truly annual; leaves & often stem flaccid; stems loosely tufted or on a slender rhizome & with more or less elongate lower internodes, hardly stoloniferous when flowering.—§ Micranthers.
 - ‡ Ligule very short; keels of palea serrulately scabrid.
- 12. P. khasiana. Stapf; stem slender erect or ascending, leaves linear long-acuminate, ligule very short truncate, panicle narrowly pyramidal, lower branches 3-5-nate and branchlets scaberulous, spikelets 1-1 in 3-4-fld. gls. rather distant, I oblong-lanceolate acute margins very narrowly hyaline, II ovate-lanceolate, fl. gls. minutely granulate, nerves prominent base nearly glabrous, wool copious or scanty, keels of palea scabrid.—Poa himalayana & Poa n. 17, Herb. Ind. Or. Hf. & T.

SIKKIM HIMALAYA, alt. 11-14,000 ft., J. D. H., King's Collector. KHASIA

HILLS, alt. 4-6000 ft., J. D. H. & T. T., Clarke.

Stems loosely tufted, 1-2 ft., suberect from a rooting base, internodes 5-6, upper gradually longer, loosely or rather tightly sheathed, or the upper shortly exserted. Leaves up to 4-6 by $\frac{1}{13} + \frac{1}{10}$ in., flaccid, flat, smooth or margins roughish; sheaths smooth, uppermost up to 5 in., usually longer than the blade; ligule erose. Panicle 4-6 in. long, lax, sometimes subsecund; lower branches subrigid or flexuous, slender, at length spreading or deflexed, unbranched except the tips or loosely branched almost from the base. Spikelets ovate-oblong, pale green; gls. firm; I $\frac{1}{2}$ in., 1-nerved, keel rough; II rather longer and broader, 3-nerved; flg. gls. $\frac{1}{2}-\frac{1}{2}$ in., oblong, obtuse, tip shortly hyaline, nerves 5 distant, keel and outer nerves sparsely silky or subglabrous. Anthers $\frac{1}{2}\frac{1}{2}\frac{1}{2}$ in.—Differs from P. annua var. sikkimensis in being taller, with leaves long-attenuate, ligule very short, branches of panicle 3-5-nate, in the wool, and in the keels of the palea not ciliate; and from P. annua var. sepalensis, in the 3-5-nate more flexuous branches, rather larger spikelets, narrower firmer gls. with more prominent nerves, rough keels of the palea and rather longer anthers.

- ## Ligule long; keels of palea ciliate.
- 1. Spikelets obovate; gl. I & II equalling the flg. or rather shorter.
- 13. P. hirtiglumis, Hook. f.; stem stout, lower internodes usually

short, upper elongate, lower sheaths lax scarious, leaves linear flat or plicate acute flaccid, panicle pyramidal, lower branches binate spreading or deflexed, spikelets & in. obovate 2-fld., flg. gls. broadly oblong obtuse, base copiously silky-hairy, wool 0, keels of palea long-ciliate. P. alpina partly, & P. flexuosa, ??partly Herb. Ind. Or. Hf. & T.

SINKIM HIMALAYA, alt. 16-18,000 ft.; ?Lachoong Valley, alt. 11,000 ft., J. D. H.

- Stems 8-12 in., from a slender evanescent rhizome, forming lax stoloniferous tufts with the surculi, smooth, terete; internodes mostly very short, the penultimate $=\frac{1}{4}-\frac{1}{4}$ the stem, uppermost up to 6 in., exserted. Leaves 2-3 by $\frac{1}{18}-\frac{1}{10}$ in., chiefly crowded towards the base of the stem, with 1-2 shorter higher up, or all short, glabrous, smooth with roughish margins; lower sheaths lax, scarious, upper up to 3 in., membranous, smooth; ligule $\frac{1}{18}-\frac{1}{10}$ in., ovate, obtuse. Panicle up to 2 in., lax, lower branches $1\frac{1}{2}$ in. shorter, naked for most of their length, smooth, branchlets roughish. Spikelets shortly or the terminal longer pedicelled, loosely disposed or the terminal crowded, green or suffused with violet, rachilla pilose; gls. firm, I $\frac{1}{2}$ in., acute, 1-nerved, keel roughish; II rather larger, acute, 3-nerved; flg. gls. rather longer than II, upper $\frac{1}{2}$ hyaline, nerves obscure. Lodicules unequally 2-lobed. Anthers $\frac{1}{2}$ in., linear. Grain elliptic-coblong, laterally compressed.
 - 2. Spikelets ovate or oblong; gls. I & II distinctly shorter than the flg.
- 14. P. himalayana, Nees ex Steud. Syn. Gram. 256; stem tall erect or ascending slender weak, leaves linear flat long-acuminate rather flaccid, ligule ovate or oblong, panicle contracted or effuse. lower branches 2- rarely 3-4-nate long capillary flexuous, spikolets \(\frac{1}{2}\)-\frac{1}{2} in 3-4-fld., gls. distant, gl. I lanceolate acuminate margin hardly hyaline, flg. gls. narrow tip alone hyaline, base scantily silky-hairy; keels of palea long-ciliate. Duthie Grass. N.W. Ind. 40.—Deschampsia, Wall. Cat. n. 8885.—Poa n. 18, Herb. Ind. Or. Hf. & T.

TEMPERATE & ALPINE HIMALAYA, from Kashmir to Bhotan, alt. 7-13,000 ft.,

Royle, Wallich, Griffith, &c.

Stems 12-18 in., loosely tufted, smooth, internodes 5-6, gradually longer upwards, mostly exserted. Leaves $1\frac{1}{3}-3$ by $\frac{1}{12}-\frac{1}{10}$ in., rarely broader, narrowly linear, roughish above, glabrous beneath; sheaths appressed, smooth, upper about 4 in.; liqule about $\frac{1}{13}$ in., ovate or oblong. Panicle up to 6 in., rather flaccid, very lax, rachis smooth; lower branches about 2 in., loosely forked at the tips only, branch-lets roughish. Spikelets $\frac{1}{2}-\frac{1}{2}$ in., rather distant, oblong, pale green; gls. thin; I $\frac{1}{13}-\frac{1}{2}$ in., 1-nerved, keel roughish; II rather larger, 3-nerved, lateral nerves long; flg. gls. $\frac{1}{2}-\frac{1}{2}$ in., oblong, subobtuse; nerves 5, slender, elongate, sometimes prominent, outer pair & keel or the keel only silky-hairy, wool scanty. Lodicules minute, unequally 2-fid. Anthers about $\frac{1}{10}$ in., linear.

15. P. tremula, Stapf; stem rooting at the base ascending, leaves flat or of the surculi plicate acute flaccid, sheaths of upper largest, ligule oblong, panicle pyramidal, lowest branches solitary or binate, spikelets lax oblong; in 3-6-fld., gl. I oblong lanceolate, II acuminate 3-nerved, flg. gls. with upper ‡ hyaline, wool rather copious, keels of palea shortly ciliate. P. altaica, Munro in Herb. Jacquemont (n. 277). P. nepalensis, & nemoralis, Herb. Ind. Or. Hf. & T. (in part). P. trivialis Griseb. in Goett. Nachr. (1868) 75; Duthie Grass. N.W. Ind. 41.—Festuca, Wall. Cat. n. 3798.

TEMPERATE & ALPINE HIMALAYA; from Kashmir, elt. 8-15,000 ft., Jacquemont, &c., to Garwhal, Duthie. Western Tibet; Ladak, Thomson, Schlagintweit.

Stems 15-20 in., stoloniferous, erect or ascending from a prostrate rooting base; internodes 5-7, gradually lengthening upwards, all but the upper included in the sheaths. Leaves 4-8 by $\frac{1}{2}$ in., linear, acute, smooth or nearly so, glabrous, flaccid, upper often longer than their sheaths; lower sheaths lax, upper about 6 in., smooth; ligule $\frac{1}{4}$ - $\frac{1}{4}$ in., obtuse, or shorter in the surculi. Pantole up to 10 in., pyramidal, often elongate, very lax and flaccid, rachis smooth; lower branches often 6 in., capillary, flexuous, loosely branched and at the tips only, nearly smooth, branchlets roughish. Spikelets distant, oblong, pale green; rachilla glabrous or hairy; gls. thin, rather distant; I $\frac{1}{4}$ - $\frac{1}{4}$ in., acute or acuminate, 3-1-nerved, margins hyaline, keel roughish; II rather larger, broader in the middle, lateral nerves sometimes short; fig. gls. $\frac{1}{4}$ - $\frac{1}{4}$ in., oblong, subobtuse, keel and all the obscure nerves and interspaces or the outer only silky-hairy; palea $\frac{1}{4}$ -shorter, keels ciliate especially towards the base. Lodicules unequally 2-lobed. Asthers $\frac{1}{4}$ - $\frac{1}{4}$ -in, elongate-oblong.

Var. micranthera, Stapf; fl. gls. less hairy, anthers smaller, gls. I and II usually thinner, lateral nerves sometimes obscure.—Kashmir, alt. 12-13,000 ft.,

Clarke, Duthie.

16. **P. Gammicana**, *Hook. f.*; stem leafy throughout, leaves broadly linear long-acuminate, ligule oblong, panicle contracted or at length open, lower branches binate or solitary, spikelets $\frac{1}{4-\frac{1}{2}}$ in. 3-2-fid., gls. firm, I lanceolate acute, II narrowly oblong, fl. gls. oblong tip only hyaline, nerves prominent outer and keel silky-hairy, keels of palea shortly ciliate, wool scanty.

SIKKIM HIMALAYA; Tankra Mts., alt. 12,000 ft., Gammie.

Stems 1-2 ft., terete, smooth, leafy; internodes 7-8. Leaves up to 4 by \(\frac{1}{4}\) in, scattered along the whole stem up to the panicle, flat or plicate, glabrous, smooth, except the margins and midrib, upper shorter; lower sheaths lax, median \(2\frac{1}{4}\)-\frac{1}{4}\] in., asperulous or nearly smooth, except the margins; ligule \(\frac{1}{4}\)-\frac{1}{4}\] in., acute, dorsally roughly puberulous. Panicle up to \(4\frac{1}{4}\) in., narrow, lower branches capillary, flexuous, loosely branched at the tips only; branches and branchlets smooth. Spikelets \(\frac{1}{4}\) in. and upwards, shortly or the terminal longer pedicelled, oblong, acute, pale green; gls. firm, I \(\frac{1}{4}\) in., 3-nerved, margin entire hardly hyaline; II rather longer, narrowly oblong, 3-nerved; fl. gls. \(\frac{1}{4}\) in., acute or subobtuse, keel and outer nerves prominent silky-hairy, palea rather shorter. Lodicules subquadrate, shortly 2-lobed. Anthers \(\frac{1}{4}\)-in., oblong.

17. P. annua, Linn. Sp. Pl. 68; stem shortly creeping and rooting stoloniferous, leaves flat flaccid acute, panicle ovate or oblong sometimes subsecund lower branches at length spreading or deflexed, spikelets 3-7-fld., gls. 1 and II oblong-lanceolate obtuse, fig. gls. prominently 5-nerved margins and tip broadly or narrowly scarious, keel and nerves below more or less silky ciliate, keels of palea long-ciliate, anthers minute. Host Gram. Austr. ii. t. 64; Fl. Dan. t. 1686; Engl. Bot. t. 1141; Knapp Gram. Britt. t. 52; Reichb. Ic. Fl. Germ. t. 82; Ledeb. Fl. Ross. iv. 377; Boiss. £l. Orient. v. 601; Griseb. in Goett. Nachr. (1868) 75; Wight Cat. n. 1789; Thue. Enum. Pl. Zeyl. 372; Trim. Cat. Ceyl. Pl. 110; Aitchis. Cat. Panjab Pl. 168; Duthie Grass. N.W. Ind. 40, Fodd. Grass. N. Ind. 67. P. alpina, Herb. Strach. & Winterb. n. 12. P. Royleana, Nees ex Steud. Syn. Gram. 256. Herb. Strach. & Winterb. n. 3; Duthie l. c.; Griseb. in Goett. Nachr. (1868) 75.

Throughout the TEMPERATE & SUBALPINE HIMALAYA, & WESTERN TIBET, alt. 6-12,000 ft., the Khasia and Nilehiri Hills, alt. 5-7000 ft. (introduced?). CEYLON (introduced?).—DISTRIB. Europe, Temp. Asia.

Annual or perennial; stolons slender. Stems 6-12 in., erect, usually geniculate, slightly compressed, smooth; internodes gradually lengthening upward, upper VOD. VII.

exserted or not. Leaves 2-4 in., rarely more, by \(\frac{1}{3} - \frac{1}{3} \) in., linear, smooth, margin roughish; sheaths up to 2 in., lax, subcompressed, usually longer than the blade, margins roughish; ligule ovate or oblong, up to \(\frac{1}{2} \) in., shorter in the lower leaves. Panicles up to 3\(\frac{1}{2} \) in., rigid, lower branches up to 1\(\frac{1}{2} \) in., 2- rarely 3-5-nate or solitary, spreading, naked to the middle and branchlets smooth. Spikelets \(\frac{1}{2} - \frac{1}{2} \) in., subseasile or shortly pedicelled, more or less crowded, ovate or oblong-ovate, green or purplish; gl. I \(\frac{1}{13} - \frac{1}{10} \) in., lanceolate, acute, 1-nerved, with sometimes 2-slender lateral nerves, keel minutely scaberulous; II rather longer, 3-nerved; fig. gls. \(\frac{1}{2} \) in., oblong.

obtuse, rarely subacute. Anthers 10 in. Grain 15-15 in., oblong.

Var. nepalensis, Griseb. in Goett. Nachr. (1868) 75, perennial, stem 20 in., leaves 12-20 in., ligule shorter, panicle up to 6 in., lower branches almost capillary, upper and branchlets subscaberulous, spikelets more distant longer pedicelled glaucous green, keel and outer nerves of fl. gl. silky-hairy to the middle, wool often copious.—P. annua, β. Nees in Herb. Royle. Pou nepalensis, Wall. ex Duthie Grass. N.W. Ind. 40.—Poa, Wall. Cat. n. 3791. Western Himalnya, from Dalhousie to Nepal.

Var. sikkimensis. Stapf; perennial, rootstock slender giving off stems surculi and stolons at the nodes, leaves up to \(\frac{1}{2}\) in. broad, ligule \(\frac{1}{2}\)—\(\frac{1}{2}\) in. denticulate, panicle 3-6 in., branches slender flexuous and branchlets subscaberulous, glumes firmer, fig. gls. nearly glabrous, wool 0. P. alpina & nepalensis (in part), Herb. Ind. Or. Hf. & T.— Eastern Himalaya, alt. 11-15,000 ft., J. D. H., &c., W. Bhotan, Cummins. Some specimens approach P. himalayana in their slender habit and narrower leaves, but the ligule is much larger.

UNKNOWN SPECIES.

P. HANSIANA, Royle Ill. Bot. Himal, 416 (name).—Hansi & Saharunpore, Royle. Probably, from the localities, P. annua.

119. COLPODIUM, Trin.

See 103. Catabrosa, Beauv. p. 310.

120. GLYCERIA, Br.

Perennial, rarely annual grasses. Leaves linear, flat or convolute. Spikelets few or many-fld., in contracted or effuse panicles; rachilla jointed between the flg. gls. rarely hairy, uppermost fl. usually imperfect. Glumes I and II hyaline, empty, persistent, 1-5-nerved; flg. gls. broadly oblong obovate or fan-shaped, dorsally rounded, 3-9-nerved, nerves often obscure vanishing below the broadly hyaline obtuse rounded (rarely subacute) or truncate tip; keels of palea smooth or scaberulous. Lodicules 2, minute or well developed. Stamens 3. Styles short, distinct. Grain terete or compressed, free or subadherent to the palea—Species about 30 enumerated.

- Sect. I. Hydrochloa. Flg. glumes strongly 7-nerved. Lodicules minute.
- 1. G. tonglensis, Clarke in Journ. Linn. Soc. xv. (1876) 119; very slender, leaves narrow smooth, panicle elongate slender, branches few erect at length spreading unequal lower up to 4 in. erect at length deflexed, soikelets $\frac{1}{8}-\frac{1}{4}$ in. 4-8-fld., gls. I and II 1-nerved. G. caspica, Griseb. in Goett. Nachr. (1868) 76 (non Trin.) G. fluitans, Duthie Grass. N.W. Ind. 41 (non Br.). G. rivularis, Jacquem. mss.—Poa n. 24, Herb. Ind. Or. Hf. & T.

TEMPERATE HIMALAYA, from Kashmir, alt. 7-9000 ft., and Kumaon, alt. 4-5000 ft., to Sikkim, alt. 7-12,000 ft. Munipore, alt. 9000 ft., Watt.

Stems widely creeping in wet places, more tufted in drier, 4-18 in., ascending,

slender. Leaves 3-8 by 10-1 in., flat, tips obtuse; sheaths smooth, closed to the mouth; ligule short, rounded or truncate, 2-auricled. Panicle very variable, 4-8 in. long; rachis slender; branches few-fid. Spikelets pale-green or purplish, rarely more than 4-fld.; rachilla flexuous, glabrous; glumes glabrous, I and II ovate or ovate-oblong, hyaline, obtuse or subscute, I = about 1 II; flg. gls. chartaceous, ovate-oblong, tip rounded hyaline, nerves 7 very prominent; palea rigid, incurved, keels strong scaberulous. Anthers very small, linear-oblong. Grain long, slender.—Very near G. fluitans, Br., of which it may be a variety, but differs from it in the much smaller and fewer-fld. spikelets. Some luxuriant specimens from marshy woods in Sikkim have larger 6-10-fld. spikelets nearly \(\frac{1}{2}\) in. long.

Sect. II. Atropis. Fl. gls. 5-nerved. Lodicules large, hyaline.

2. G. distans, Wahlb. Fl. Upsal. 36; leaves linear flat or convolute smooth, panicle erect pyramidal or contracted lower branches up to $2\frac{1}{2}$ in. at length deflexed, spikelets $\frac{1}{13}$ $\frac{1}{2}$ in. 4-6-fld., gls. I and II very unequal scarious obtuse, fig. gls. broadly ovate-oblong or cuneate tip rounded or retuse and mucronulate crenate. Fl. Dan. t. 2222; Reichb. Ic. Fl. Germ. t. 79; Duthie Grass. N.W. Ind. 41. Poa distans, Linn. Mant. 32; Host Gram. Austr. ii. t. 63; Fl. Dan. t. 251; Engl. Bot. t. 986; Knapp Gram. Britt. t. 47. Atropis distans, Griseb. in Ledeb. Fl. Ross. iv. 388, in Goett. Nachr. (1868) 76; Boiss. Fl. Orient. v. 615. Festuca distans, Kunth Revis. Gram. i. 129, Enum. Pl. i. 393, Suppl. ii. 303.

WESTERN TIBET, alt. 10-16,000 ft., abundant, Thomson, &c.—DISTRIB. Europe, N. Asia.

Stems densely tusted with copious fibrous roots, 4-24 in. high, erect or ascending, stout or slender, leafy upwards or at the base only. Leaves very various, flat and \(\frac{1}{2} \) in. broad in large specimens, quite smooth; sheaths open for \(\frac{3}{2} \) of their length, lower membranous shining; ligule short, scarious. Paniele 3-5 in., rachis and I ranches smooth, lower branches 2-5-nate. Spikelets minute, green, more or less sining, minutely scaberulous; gl. I oblong, 1-nerved; II almost twice as large, u uslly 1-nerved; fig. gls. very variable, base minutely hairy, margins and tip broadly hyaline, nerves reaching \(\frac{1}{2} \) from the base; keels of palea ciliate. Lodicules oblong, toothed. Anthers \(\frac{1}{2} \) of in.

Var. convoluta, Boiss. l. c.; stem taller very slender, leaves all convolute, panicle long narrow, branches shorter erect. G. convoluta, Fries Mant. iii. 176. Festuca convoluta, Kunth Revis. Gram. i. 129; Enum. Pl. 393. Atropis tenuiflora, Griseb. in Ledeb. Fl. Ross. iv. 389, in Goett. Nachr. l.c. 76.—Tibet common, N. Europe und Asia.—A different-looking plant from G. distans in its Tibetan form, being much more slender, with narrower more ovate fig. gls.; but very variable, and with

intermediates.

3. **G. Thomsont,** Stapf; leaves rigid asperulous above smooth beneath, lowest branches of panicle 2-3 in. spikelets up to 1 in. oblong 3-5-fid., gl. I 10 in. oblong-lanceolate subacute, II 1 in. elliptic-oblong obtuse, fig. gl. 1 in. tip subacute and margins hyaline yellow. Poa compressa, Griseb. in Goett. Nachr. (1868) 75.

WESTERN TIBET, Rupchu above Pugha, alt. 15,500 ft., Thomson.

Turted, innovations erect. Stem rather stout, compressed, glabrous, sheathed throughout. Leaves up to 6 in., tapering to an acute or subobtuse point, upper short, pale green, thick, rigid, nerves 7-9 strong; sheaths more or less compressed, not keeled, smooth, striate, loose above; ligule broadly ovate, obtuse, scarious. Panicle ovate-oblong or contracted, erect or inclined; rachis scaberulous or smooth below; branches geminate, filiform, sparingly divided at length spreading, naked to about the middle; lateral pedicels short. Spikelets pale green or variegated; rachilla glubrous; gl. I 1-nerved, margin broadly hyaline; II 3-nerved, tip and margins

hyaline; fig. gls. smooth, glabrous, 5-nerved, outer nerves short. Lodicules obtiquely ovate, acute. Anthers 10 in. Ovary obliquely ovoid; styles very short, subterminal.—The long subacute fig. gls. are characteristic.

4. **G.** poacoides, Stapf; leaves complicate scabrid above, longest branches of panicle $1-1\frac{1}{2}$ in., spikelets $\frac{1}{3}-\frac{1}{4}$ in. 2-4-fid., gl. II about $\frac{1}{10}$ in., fig. gls. $\frac{1}{8}$ in. obtuse tip broadly hyaline.

WESTERN TIBET; Rupchu, grassy plains at the head of the Salt Lake, Thomson. Stems 1-14 ft., tufted, erect; innovation extravaginal erect, their sheaths open to near the base. Leaves 2-4 in., linear subscute, rather thick, smooth beneath, ligule triangular ovate acute. Panicle 2-4 in., erect or inclined, rachis scabrid; branches 2-4-nate, filiform, erect, sparingly divided, scaberulous, lowest very unequal, lateral pedicels clavate. Spikelets oblong rather loose, pale green or purplish, rachilla glabrous, disarticulating; gls. thin, finely ciliate-serrulate; callus glabrous; I ovoid acute, 3-nerved, side nerves faint short; II similar with stronger side-nerves; flg. gls. broadly elliptic-oblong, quite glabrous, dorsally rounded, nerves obscure except with transmitted light; keels of palea scantily shortly ciliate. Lodicules obliquely ovoid. Anthers 15 in. Ovary pyriform. glabrous.

121. **FESTUCA**, *Linn*. (by O. Stapf.)

Perennial, rarely annual grasses. Leaves flat convolute or setaceous. Spikelets 3- many-fld., in open or contracted sometimes spiciform panicles, uppermost fl. imperfect; rachilla jointed below the flg. gls. not produced beyond the uppermost imperfect. Glumes 5 or more; I and II subequal or unequal, empty, persistent, keeled; I 1- very rarely 3-nerved, II 3- very rarely 5-nerved; flg. gls. narrow, acute acuminate or awned, 5-7-nerved, dorsally rounded, or keeled towards the tip only; palea 2-keeled. Lodicules 2. Stamens 3. Ovary glabrous or crown more or less hairy, not or slightly enlarged; styles terminal, rarely subterminal, stigmas plumose. Grain wentrally concave or grooved rarely flat. glabrous or crown hairy, free or more or less adherent with the palea, rarely with the gl., hilar area elongate.—Species many, chiefly of temp. climates.

The species are for the most part extremely difficult of discrimination.

- Sect. I. Eu-Festuca. Perennial. Empty gls. subequal. Stamens 3.
- A. Vernation of all the leaves conduplicate permanently, or cauline more or less flat, always very narrow.
- * Flg. gls. strongly involute, tightly embracing the grain firm, scabrid or if smooth not shining; ovary glabrous, innovations always intravaginal, their leaf-sheaths usually open to or near to the base, or middle in F. Cumminsii.
- 1. F. valeniaca, Schleich. ex Gaud. Agrost. Helvet. i. 242; slender, rigid, erect, leaves 2-6 in., panicle 1-2 in. narrow usually stiff, branches very short, spikelets & in. 3-4-fid., awn much shorter than its gl., anthers linear & in., grain adherent to palea and often to the gl. Kunth Enum. Pl. i. 401, Suppl. 334; Reichb. Ic. Fl. Germ. t. 63; Steud Syn. Gram. 306. F. duriuscula, & parviflora, Hack. in Herb. Duthie, & var. tenuis, Hack. Monogr. Fest. Europ. 288. F. ovina, L., var. Pseudovina, Hack. l. c. F. ovina, Host Gram. Austr. ii. 62, t. 86 (non Linn.). F. stricta, Herb. Royle. F. dubia & F. filiformis, Jacquem. mss.—F. n. sp. Herb. Strach. & Winterb. n. 2.

TEMPERATE and ALPINE HIMALAYA, alt. 10-16,000 ft., from Kashmir to Sikkim.

-DISTRIB. Central and Eastn. Europe, Orient, Central Asia, Rocky Mts.

Stems 4-14 in. tufted, nodes 2, both in the lower 1 of the stem. Leaves 2-6 in., setiform to capillary, 3-5-nerved, green or glaucous, rarely rough, bands of sclerenchyma distinct; sheaths of innovs. tight, smooth, open to near the base, persistent when dry; ligule very short, obscurely auricled. Panicle contracted; branches erect, solitary or 2-nate; lateral pedicels shorter than the spikelets. Spikelets oblong, broadly obovate when open, pale green or purplish; gl. I 1 in., lanceolate, acute or subacute; II similar 1 in.; fig. gls. 1 f in., smooth to scaberulous, pruinose, 5-nerved; palea oblong-lanceolate, sub-2-toothed, keels scabrid. Lodicules minute, obliquely ovoid. Anthers 30-14 in., linear. Ovary glabrous. Grain 1 in., ventrally grooved, hilum almost as long as itself.—As represented in India F. valeriaca is a very well defined species.

Var. tibetica, Stapf; stem 2-6 in., sheaths entire below the middle, panicle $\frac{1}{2}$ -1 in. long up to $\frac{1}{4}$ in. broad, fig. gls. $\frac{1}{2}$ in., more or less purplish black and scabrid in the upper $\frac{1}{4}$, awn minute, anthers $\frac{1}{30-\frac{1}{30}}$ in. F. ovina, var. alpina, Griseb. in Goett. Nachr. (1868) 73. Tibet N. of Sikkim, alt. 17-19,000 ft. Differs from F. ovina, var. Halleri, to which it is referred by Hack. l. c. 112, in the sheaths being

open to the middle and in the very minute anthers.

2. **F. Cumminsti**, Stapf; stem slender, leaves ‡-4 in., sheath open to below the middle, panicle 2-4 in. narrow nodding or flexuous, branches distant erect and flexuous, spikelets ‡-‡ in. elliptic or (open) obovate awned, rachilla scabrid, flg. gls. oblong-lanceolate, palea 2-fid, anthers elliptic $\frac{1}{30}$ in., grain free. F. duriuscula, Herb. Ind. Or. Hf. & T. (in part).

SIKKIM HIMALAYA, alt. 11-12,000 ft., J. D. H. W. BHOTAN, Cummins.

Stems 1-1½ ft., tufted, nodes 2-3 uppermost towards the middle, smooth except (usually) below the paniole. Leaves setaceous, or cauline rarely flat, very narrow ($\frac{1}{4^0}$ in.), subacute, smooth, nerves 5 green strong above, obscure beneath, marginal and carinal bands of sclerenchyma very slender; sheaths of innovs. open far beyond the middle, smooth, subpersistent, of the cauline leaves tight; lignle short, auricles usually long and acute. Paniols with scabrid rachis; branches usually solitary, dividing from near the base, scabrid; lateral pedicels shorter than the spikelets or very short. Spikelets pule green or purple, more or less scaberulous; I $\frac{1}{10}$ in., 1-nerved; II lanceolate, acute, $\frac{1}{7}$ - $\frac{1}{7}$ in., 3-nerved; flg. gls. $\frac{1}{7}$ - $\frac{1}{7}$ in., awn half as long to as long as the gl.; palea as long as the gl., conspicuously 2-fld, more or less scabrid. Lodicules 2-lobed. Overly glabrous. Grain linear-oblong, $\frac{1}{7}$ - $\frac{1}{7}$ in., ventrally grooved, hilum slightly exceeding the middle.

3. **F. polycolea**, Stapf; densely tufted, leaves setaceous, sheaths of innovs. crowded open to the base, panicle 2-3 in. open or contracted rigidly erect, rachis scabrid rarely nodding, branches subsolitary, spikelets $\frac{1}{2-\frac{1}{3}}$ in., glumes scabrid, fig. gls. oblong-lanceolate awned, palea 2-fid, anthers linear $\frac{1}{17}$, $\frac{1}{14}$ in., grain free. F. duriuscula, Herb. Ind. Or. Hf. & T. (in part).

NEPAL, Wallich. SIRKIM, alt. 12-16,000 ft., J. D. H., &c.

Stems \(\frac{2}{4} - 1 \rightharpoonup \) ft., nodes 2 in the lower half or third, smooth or scabrid below the panicle. Leaves rather rigid, of the innovations up to 6-8 in., subacute, smooth, not or obscurely sulcate, 5-nerved, bands of sclerenchyma continuous beneath or neutry so; sheaths persistent, pale, shining, of the stem tight smooth; ligule very short, obtusely auricled. Panicle ovate or narrower; lower branches scabrid, sometimes 2-nate, \(\frac{1}{2} - \text{rarely } 1 \frac{1}{2} \) in., very sparingly divided from near the base, upper with 1-2 spikelets; lateral pedicels shorter than the spikelets. Spikelets greenish; glumes firmly membranous; I \(\frac{1}{2} \) in., subulate-lanceolate, 1-nerved; II \(\frac{3}{2} - \frac{1}{10} \) in.

lanceolate, acute; fig. gls. 1-1 in., strongly involute, nerves 5 faint; awn from 1 to as long as the gl.; palea as long as the gl., scabrid or pubernlous. Lodicules 2-lobed. Ovary glabrous. Grain 10 in., linear-oblong, deeply grooved, hilum slightly exceeding the middle.

Var. brevis, Stapf; stems 4-6 in. often shorter than the leaves, sheaths open to the middle only, panicle $\frac{1}{2}-1\frac{1}{2}$ in. contracted, fig. gls. $\frac{1}{2}$ in., anthers $\frac{1}{12}$ $\frac{1}{17}$ in.—Sikkim Himalaya, alt. 11-13,000 ft.—Referred by Hackel (Monogr. Festuc. Eur. 89) to F. ovina, var. supina, but evidently only a dwarfed state of F, rolycolea.

- ** Fig. gls. glabrous or nearly so except sometimes towards the tip, thin, more or less shining; ovary very rarely glabrous.—Innovations intravaginal, their sheaths closed to beyond the middle, except in nitidula.
- † Flg. gls. $\frac{1}{8}$ in.; anthers minute; panicle usually very flexuous and flaccid.
- 4. **F. nitidula**, Stapf; stems tufted, node solitary near the base, leaves 1-2 in. very narrow, panicle $1\frac{1}{2}$ -3 in.. ovate open or contracted, branches usually spreading flexuous naked to beyond the middle, spikelets $\frac{1}{6}$ - $\frac{1}{4}$ in. 2-5-fld., margins of gls. narrowly hyaline, flg. gls. $\frac{1}{7}$ in. oblonglanceolate, awn half as long as the gl., anthers elliptic $\frac{1}{30}$ $\frac{1}{40}$ in., ovary top sparsely hispidulous. F. pumila, Duthie Grass. N.W. Ind. 42 (non Vill.); Herb. Strack. & Winterb.—Festuca, n. 10, Herb. Ind. Or. H.f. & T

WESTERN TIBET; Nubra, alt. 12-14,000 ft., Thomson. N. of Kumaon, alt. 15,000 ft., Strackey & Winterbottom.

- Stems \(\frac{1}{2} 1 \) ft., far exserted beyond the uppermost sheath, smooth. Leaves complicate, rather thick, green, 5-7-nerved, smooth, bands of sclerenchyma hardly any; sheaths of innova. closed to about \(\frac{1}{2} \), smooth; ligule very short, ciliolate, more or less auricled. Pasicle flexuous, sometimes flaccid; rachis smooth below; branches up to \(\frac{1}{2} \) in., solitary or lowest 2-nate, subcapillary, sparingly divided; lateral pedicels often very short. Spikelets elliptic to lanceolate, green or purplish; gls. thinly membranous, I \(\frac{1}{17} \frac{1}{10} \) in., lanceolate; II \(\frac{1}{2} \) in., lanceolate, distinctly 3-nerved; flg. gls. smooth, very minutely scaberulous below the tip; awn \(\frac{1}{2} \) as long as the gl.; palea about as long as the gl., keels scaberulous. Lodicules 2-lobed. Grain \(\frac{1}{16} \) in., free or adherent to the base of the palea, linear-oblong, hilum \(\frac{1}{2} \) of the grain.— Thomson's specimens are tall and very slender, Struchey & Winterbottom's only 3-5 in. high.
- 5. **F. undata**, Stapf; stems tufted erect or base geniculate sheathed beyond the middle or almost to the panicle, nodes 2-3, uppermost about median, leaves subsetaceous subacute complicate or the cauline flat tapering to a fine point, panicle 4-6 in. flaccid flexuous, branches few subcapillary flexuous, spikelets \(\frac{1}{4-\frac{1}{3}}\) in. 2-4-fld. lanceolate, gls. thinly membranous, flg. gls. oblong-lanceolate, awn 0 or very short, anthers not \(\frac{1}{3}\) in. top of ovary hispidulous rarely glabrous.—Bromus, No. 16, Herb. Ind. Or. H. f. & T.

SIKKIM HIMALAYA, alt. 12,000 ft., J. D. H.

Stems 1-2 ft. Leaves glabrous or puberulous above, 7-9-nerved, green; sheaths tight, basal thin brown rarely finely hairy; ligule very short, truncate, scarcely auricled, glabrus or sparsely ciliolate. Pasicle often mere or less secund; rachis smooth or scabrid, very slender; brauches simple or very sparingly divided, solitary or the lowest binate up to 3 in. Spikelets pale green, somewhat shining; rachilla scantily scabrid, internodes very short; gl. I $\frac{1}{12}$ in., henceolate, 1-nerved; II $\frac{1}{2}$ in., broadly lanceolate, acuminate, 3-nerved; palea oblong-lanceolate, about equal the gl., obscurely 2-toothed. Lodicules obliquely ovoid, sub-2-lobed. Anthers violet. Styles terminal.

Var. aristata, Stapf; awn as long as the gl. or rather longer very slender, anthers $\frac{1}{10} - \frac{1}{10}$ in., ovary (very young) glabrous.—Bromus?, No. 15, *Herb. Ind. Or. Hf. & T.*—Sikkim, alt. 11,000 ft.

- †† Flg. gls. $\frac{1}{5}$ - $\frac{3}{10}$ in.; anthers linear, $\frac{1}{12}$ - $\frac{1}{6}$ in.; panicle less wavy or flaccid.
- 6. F. kashmiriana, Stapf; stems tufted, nodes 1-2 rarely 3 uppermost below the middle, leaves of the innovs. hexagonal, panicle 2-5 in., branches solitary lowest rarely geminate, spikelets \$\frac{1}{2}\$ in. elliptic-oblong 3-5-fid., gls. thinly membranous, fig. gls. oblong-lanceolate \$\frac{1}{2}\$-\$\frac{1}{2}\$ in., awn = \$\frac{1}{2}\$ gl. or longer, top of ovary densely hispid, grain loosely adherent to the pales. F. duriuscula, Duthie Grass. N.W. Ind. 41; Herb. Royle & Hook. f. & T. in part.

TEMPERATE and ALPINE HIMALAYA; from Kashmir to Kumaon, alt. 8-14.000 ft.

Stem 1-2 ft., innovations always apo-geotropic; sheaths of (always?) intravaginal shoots, tight, smooth, closed to the middle or 1, rarely higher. Leaves (cauline) setaceous, usually shorter than of the innovations, rarely flat, more or less puberulous above, smooth beneath, green, sulcate between the 5-7 nerves, bands of sclerenchyma distinct; ligule short, truncate, ciliolate, scarcely auricled. Panicle usually contracted, rather stiff or flexuous; rachis scaberulous or smooth below; branches erect or spreading, filiform, scaberulous, sparingly divided from below the middle; lateral pedicels = 1 the spikelet or shorter. Spikelets green or tinged with purple or violet; gls. smooth or obscurely scaberulous; internodes of rachilla 10 in., minutely scaberulous; gl. l 13 10 in., lanceolate, 1-nerved; II 4 in., lanceolate or ovate-lanceolate, acute, 3-nerved; fig. gls. faintly 5-nerved. Lodicules obliquely oblong, 2-lobed. Anthers 15 in., linear. Grain in., linear-oblong, grooved, hilum nearly as long as the grain. - I have seen only one specimen amongst all the forms of F. kashmiriana with apparently (but by no means typical) extravaginal innovations. Variegated specimens of the type resemble var. nigricans (F. nigricans, chleich.) of F. violacea, and F. rubra var. fallaw, forma alpestris (F. nigressens, Lam.) from which they differ in absence of extravaginal shoots, more open sheaths. and more hispid ovary with a slightly developed constriction below the top.

Var. ligulata, Stapf; more flaccid, leaves up to 1 ft., ligule up to $\frac{1}{1}$ in. with more or less acute auricles. F. violacea, var. virescens, and F. rubra genuiua, Hack.

mss.-Kashmir, alt. 11-13,000 ft., Duthie.

Var. debilis, Stapf; very flaccid, cauline leaves up to 8 by $\frac{1}{10}$ in. pubescent above, nerves very prominent beneath, panicle flaccid, spikelets green, awn long or short. F. heterophylla, Lamk. ex Hack. mss.; Griseb. in Goett. Nuchr. (1868) 73.—Kashmir, alt. 8-12,000 ft., Duthis.—Approaches closely shade forms of F. heterophylla.

phylla, differing only in the structure of the leaves.

Var. simlensis, Stapf; taller, more robust, cauline leaves up to 1 ft. by \(\frac{1}{10} \) in. almost flat, ligule short, panicle 6-12 in., spikelets \(\frac{1}{2} \) \(\frac{1}{2} \) in., internodes of rachilla up to \(\frac{1}{2} \) in., gl. I \(\frac{1}{2} \) in., flg. gls. up to \(\frac{1}{2} \) in., awn = the gl. or rather shorter. F. duriuscula, Herb. H. f. \(\frac{1}{2} \) T. (in part). ? F. oving, Grissb. in Goett. Nachr. (1868) 73.—Simla, alt. 7-8000 ft., Thomson, Duthie.—Habit rather of F. duriuscula, differing in the more closed sheaths and hairy tip of ovary. Distinguished from certain forms of F. rubra, L., by the hairy ovary and absence of stolons.

7. F. altaica, Trin. ex Ledeb. Fl. Alt. i. 109, Fl. Ross. iv. 354, Ic. t. 228; stems tufted, nodes 1-2, leaves up to 9 in. subsetaceous, sheaths crowded open to the middle latterly to the base, ligule very short, panicle 4-6 in. very loose, lower branches 2-nate long slender with 1-2 subterminal spikelets, lateral pedicels equal to or longer than the 3-6-fld variegated spikelets which are \(\frac{1}{2}\)-\frac{1}{2} in. long, glumes thin tips and margins hyaline,

fig. gls. \(\frac{1}{4} - \frac{3}{10}\) in., awns shorter or gl. mucronate, ovary pyriform tip hispidulous. Kunth Enum. Pl. i. 411; Steud. Syn. Gram. 315. F. Duthiei, Hack. mss.

WESTERN TIBET; Dras, alt. 11-12,000 ft., Duthie; Karakoram, alt. 14,500 ft.,

Clarke. - DISTRIB. Central Asia, Siberia.

Stems 14-24 ft., smooth. Leaves subrigid, complicate, smooth, margin obscurely scabrid, nerves 7-9 slightly prominent, bands of selerenchyma distinct, cauline sometimes flat, short; sheaths of innovs. open to the middle, soon splitting to the base; ligule very short. Passicle ovate, rachis slender smooth, branches up to 3 in. subcapillary flexuous. Spikelets oblong, internodes $\frac{1}{30}$ in., scaberulous; gl. I $\frac{1}{4}$ - $\frac{1}{4}$ in. lanceolate, acute, 1-nerved, II $\frac{1}{30}$ - $\frac{1}{4}$ in., distinctly 3-nerved; flg. gls. oblong-lanceolate, smooth or subscaberulous towards the acute tip, nerves 5 faint; palea = the gl., linear-oblong, keels minutely scaberulous. Lodicules obliquely ovate. Anthers $\frac{1}{4}$ - $\frac{1}{4}$ in., linear. Styles terminal.—Very near the American F. scabrella, Torr. Trinius describes the rhizome as stoloniferous, but I find no trace of stolons.

- *** Fig. gls. glabrous or pubescent; top of ovary glabrous, rarely minutely hairy. Innovations intra- and extravaginal, their leaf-sheaths closed almost to the mouth, the extravaginal often stoloniferous.
- 8. **F. Levingel**, Stapf; stems smooth, nodes 2, upper in $\frac{1}{3}$ of stem, cauline leaves up to 4 in. very narrow, sheaths of innovs. open to middle, glabrous or minutely puberulous above, ligule very short obscurely auricled, panicle 2-3 in. linear strict, branches usually binate erect, lower naked for $\frac{1}{3}$, spikelets $\frac{1}{3} \frac{1}{4}$ in. 4-5-fld. compact, internodes of rachilla very short minutely scaberulous, fig. gls. $\frac{1}{3}$ oin. oblong acute awnless or mucronate, anthers oblong, overy glabrous or nearly so.

KASHMIR, Levinge.

- Stems 1½ ft., extravaginal innovations present very slender, their leaves finely setiform, flaccid, green, 5-nerved, bands of sclerenchyma fine. Panicle striate, branches often appressed to the rachis, lowermost up to 1½ in.; lateral pedicels short, thick. Spikelets green; rachilla minutely scaterulous; gls. membranous, glabrous or minutely puberulous or scaterulous; I ½ in., lanceolate, acute; II broadly oblong-lanceolate, acute or subobtuse; palea linear-oblong, almost = gls., keels ciliolate. Lodicules oblong, sub-2-lobed. Anthers ½ in. Grain ½ in., loosely adherent to the palea, linear-oblong, grooved, hilum almost = the grain.
- 9. F. rubra, Linn. Sp. Pl. 74; stems smooth, nodes 2, extravaginal innovations frequent ascending or stoloniferous, leaves subsetaceous, ligule very short truncate exauricled, panicle 3-5 in., rachis scabrid, branches solitary or lowest binate divided from or near the base, spikelets \frac{1-3}{2} in. oblong loose 4-9-fld., flg. gls. strongly involute oblong-lanceolate margin above broadly hyaline awned, anthers linear, ovary glabrous. Host Gram. Austr. ii. 59, t. 82; Engl. Bot. t. 2056; Kunth Enum. Pl. i. 401, Suppl. 334; Steud. Syn. Gram. 308; Ledeb. Fl. Ross. iv. 352; Boiss. Fl. Orient. v. 62; Duthie Grass. N.W. Ind. 42 (in part); ? Griseb. in Goett. Nachr. (1868) 74.

TEMP. and Subalpine Himalaya, alt. 6-13,500 ft. Khasia Hills, alt. 5-6000 ft. (var. Clarkei).—Distrib. Temp. and Arctic Europe and Asia.

Stems 1\frac{1}{2}-2\frac{1}{2} ft., erect or geniculate below, striate. Leaves 3-5 in., all subsetaceous or cauline linear flat, rather thick, green, 3-7-nerved, subscute or almost obtuse, smooth; sheaths of innovs. tight, smooth, closed almost to the mouth. Paniele very variable, narrow, nodding and secund or erect, rather dense and ovate, longest branches 2 in.; pedicels short. Spikelets green or variegated, glabrous or hairy and ciliate; rachilla scabrid, internodes \(\frac{1}{2}\) in.; gl. I \(\frac{1}{2}\) in., lanceolate, acuminate, nerve

percurrent or subexcurrent; II 3 in., ovate-lanceolate; fig. gls. up to 1-3 in., nerves 5, faint; awn slender, up to $\frac{1}{10}$ in.; pales = the gls., linear-oblong, shortly 2-fid, keels cilicate. Lodicules obliquely ovate, sub-2-lobed. Anthers 1 in. Ovary with rarely 1-2 minute hairs. Grain + in., linear-oblong, grooved, sometimes adherent to both gl. and pales, hilum nearly equal the grain.—It is impossible to separate the hairy glumed from the glabrous forms; these vary in specimens from different localities, and Clarke has found them growing in the same spot in the Karakoram Mts. To make a comparative analysis of the Indian forms with the Europeau and Oriental would involve a most minute examination of all the latter and lead to the creation of a number of new varieties and subvarieties with ephemeral characters. Most of the Indian specimens fall into Hackel's subsp. sur. rubra var. genuina, and var. fallax (Monogr. Festuc. Europ. 138, 142). The glabrous stoloniferous specimens answer more or less to his subvar. vulgaris; those with short erect or ascending innovations to var. fallax and mostly to forma alpestris, which has thicker leaves and highly variegated spikelets; the pubescent to his subvar. E. barbata. The principal synonyms cited by Hackel for these forms are :- F. alpestris. Wulf. Fl. Nor. Phan. Ed. Fenzl, & Graf, 151. F. barbata, Schrank Prim. Fl. Salisb. 46. F. heterophylla, Hanke in Jacq. Collect. ii. 93. F. hirsuta, Fl. Dan. t. 1627? (non Host). F. Kitaibeliana, Schult. Mant. ii. 398 (for var. genuina). F. longifolia, Hegetsch. & Heer Fl. Schw. 91. F. nigrescens, Lam. Encycl. ii. 460. F. pubescens, Willd. Enum. Pl. 6. F. repens, Hegetsch. & Heer l. c. 92. F. rubra, var. baikalensis, Grisch. in Goett. Nachr. (1868) 74, is probably this. The true F. baikalensis is not found in India.

Var. Clarkei, Stapf; extravaginal innovations very rare slender, leaves subsetaceous cauline rarely flat, paniele 3-5 in. nodding, branches few subsecund lowest up to 3 in. rigid or flexuous mostly obliquely erect, spikelets $\frac{1}{2}$ in. pale green, gl. I $\frac{1}{2}$ in., flg. gls. $\frac{1}{4} - \frac{3}{10}$ in., awn = $\frac{1}{2}$ to nearly all gl., anthers $\frac{1}{28} - \frac{1}{2}$ in., grain $\frac{1}{2}$ in.—Kangra and Dalhousie, alt. 7-8000 ft., Clarke. Khasia Hills, alt. 4-6000 ft.,

Clarke (a form with setaceous leaves and very long anthers).

B. Venation of leaves convolute, at length flat or subconvolute $\frac{1}{10} - \frac{7}{10}$ inbroad.

- * Flowers hermaphrodite; innovations (when known) extravaginal.
- † Flg. gls. awned, awn as long as the gl. or longer, very slender.

10. F. gigantea, Vill. Hist. Pl. Dauph. ii. 110; leaves amplexicaul, panicle 4-16 in., branches rather distant undivided to the middle, spikelets about $\frac{1}{2}$ in., fig. gls. $\frac{1}{10}-\frac{1}{3}$ in., awn twice as long, anthers linear. Kunth Enum. Pl. i. 407, Suppl. 339; Reichb. Ic. Fl. Germ. t. 358; Engl. Bot. t. 1820; Ledeb. Fl. Ross. iv. 354, Boiss. Fl. Orient. v. 621; Duthie Grass. N. W. Ind. 41; Griseb. in Goett. Nachr. (1868) 74 (in purt). F. aristata. C. Koch in Linnæa, xxi. (1848) 412. F. triflora, Sm. Engl. Bot. t. 1918; Desf. Fl. Atlant. 6, t. 20. Bromus giganteus, Linn. Sp. Pl. 77; Fl. Dan. t. 1630; Reichb. l. c. t. 76; Knapp Gram. Britt. t. 87; Host Gram. Austr. 87, t. 6. B. triflorus, Linn. Sp. Pl. Ed. ii. 115; Fl. Dan. t. 440.

TEMP. HIMALAYA; from Kashmir to Kumaon, alt. 5-9500 ft.—DISTRIB. Europe, N. Asis.

Rootstock very short, roots fibrous. Stems loosely tufted, 2-4 ft., smooth, nodes 3-5. Leaves 5-12 by $\frac{1}{1-\frac{1}{2}}$ in., linear to linear-lanceolate, finely acuminate, flat, flaccid, dark green, loosely many-nerved, smooth, margins minutely scaberulous; sheaths of innovs, terete, open to the base, smooth or asperulous below the mouth; ligule very short, truncate, glabrous. Panicle ovate or oblong-ovate, nodding, branches solitary or the lowermost binate, spreading, flexuous, scabrid; branchlets few-fid. spreading or appressed, pedicels short or the lower sometimes = the spikelet. Spikelets linear-lanceolate, pale green, rachilla scabrid; gls. membranous, I $\frac{1}{10}$, in.,

subulate-lanceolate, 1- or obscurely 3-nerved at the base, margin white-hyaline; II 1 in., lanccolate; fig. gls. 10-1 in., oblong-lanceolate, acute or tip obscurely 2-fid, margins narrowly hyaline, minutely puberulous below the tip, nerves faint; awn subterminal, straight or flexuous; pales oblong-lanceolate, 2-toothed, keels minutely scaberulous. Lodicules large, 2-8-fid. Anthers 10-1 in. Ovary quite glabrous. Grain ; in., linear-oblong, tightly adherent to the pales and usually the gl., groove flat: hilum nearly = the grain.

11. F. leptopogon, Stapf; leaf-base obtuse or rounded, panicle 6-12 in., branches distant dividing from near the base, spikelets 1 in. or rather more, fig. gls. 1-1 in., tip 2-fid, awn in the sinus = the gl. or rather longer. F. gigantea, Griseb. in Goett. Nachr. (1868) 74 (in part). Bromus, No. 17 & 18, Herb. Ind. Or. H.f. & T.

SIKKIM HIMALAYA, alt. 8-11,000 ft., J. D. H. KHASIA HILLS, alt. 5-6000 ft.,

Hook. f. & T., Clarke.

Rootstock short, slender, roots fibrous. Stems 2-4 ft., loosely tufted, nodes 5-6. Leaves, sheaths and ligule as in F. gigantes, but blade smaller, 4-7 by 1-1 in., and base not amplexicaul. Panicle open or contracted, erect or nodding, branches scabrid; branchlets few, distant, more or less appressed, lateral pedicels very short. Spikelets linear-lanceolate, pale green; rachilla scabrid, internodes short; gls. membranous, I 1 in., subulate-lanceolate, margins white-hyaline; II & in., lanceolate; fig. gls. scaberulous below the tip, margins narrowly hyaline, nerves faint; palea linear-lanceolate, finely pointed, keels minutely scaberulous. Lodicules 2-fid. Anthers 1 10 in., elliptic. Ovary with the top minutely hispidulous. Grain 1 in., linear-oblong, free or adherent to the base of the palea, groove very shallow, top hispid, hilum = 4 of the grain.

†† Flg. gls. awnless, mucronate.

12. F. asthenica, Hook. f.; stems rather slender, nodes 3, leaves linear narrowed at the base, panicle 5-8 in., branches capillary rough sparingly divided beyond the middle, pedicels capillary, spikelets 3 10 in. lanceolate 2-4-fld., internodes of rachilla short, flg. gls. ovate-lanceolate acute 3-5-nerved.

KASHMIR, alt. 7-9000 ft., Clarke, Duthie.

Stem tall, up to 4 ft., smooth, innovations unknown. Leaves 6-11 by $\frac{1}{7}$ in. linear, finely acuminate, flacoid, rough, pale green, many-nerved, flat, young convolute; sheaths smooth or the lower scabrid, striate; ligule 10 1 in., scarious, very obtuse, ciliolate, at length lacerate. Panicle more or less contracted, nodding, flexuous; rachis smooth below; lowermost branches up to 3 in., binate. Spikelets obovate when open, green; rachilla minutely scaberulous, internodes 10-11 in.; gls. thinly membranous; I 1-1 in., subulate-lanceolate, 1-nerved, hyaline except along the percurrent nerve; II 1-1 in., oblong-lanceolate, acute, 3-nerved; fig. gls. 1 in., ovate-lanceolate, acute, 5-nerved (2 lateral nerves very faint), scaberulous, tip hyaline; palea linear-oblong, minutely 2-toothed, keels slightly scabrid. Lodicules obliquely ovate. Anthers 10 in., linear. Ovary hispidulous on the top. Grain I in linear-ollong, dorsally flat and almost so ventrally, slightly adherent to the pales, hilum 1-1 in. shorter than the grain.

13. F. modesta, Steud. Syn. Gram. 316; stem tall rather stout, nodes 2-3, leaves of innovations linear finely acuminate, cauline smaller, panicle 6-12 in. loose open, rachis scabrid, lower branches very long binate sparingly divided beyond the middle, lateral pedicels short, spikelets about in. loosely 3-4-fid., internodes of rachilla long, fig. gls. ohlong acute 5-7-nerved. Duthie Grass. N.W. Ind. 42. F. elatior, Herb. Strackey & Winterb. n. 3. Schedonorus modestus, Nees ex Steud. l. c.

WESTERN TEMPERATE HIMALAYA, from Jamu to Kumaon, alt. 7-8700 ft.,

Royle, &c.

Stems 4-5 ft., loosely tufted; innovations ascending or stoloniform. Leaves of innovs. up to 2 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in., flat, young convolute, rough or almost smooth, subrigid, many-nerved, cauline 4-6 by $\frac{1}{4}$ - $\frac{3}{10}$ in.; sheaths open to the base, smooth or the lower rough, strongly striate, at length brown; ligule $\frac{1}{4}$ in., truncate, ciliolate, at length lacerate. Panicle ovate, lower branches up to 8 in. Spikelets green, open obovate; rachilla scabrid, internodes up to $\frac{1}{10}$ in.; gls. thinly membranous, I $\frac{1}{4}$ in., subulate-lanceolate, hyaline except along the percurrent nerve; II $\frac{1}{4}$ in., oblong-lanceolate, acute, 3-nerved; flg. gls. $\frac{3}{10}$ - $\frac{1}{4}$ in., scaberulous, margins arrowly hyaline; palea linear-oblong, 2-dentate, keels scarcely scabrid. Lodicules broadly elliptic, very obtuse. Anthers $\frac{1}{10}$ in., linear. Ovary top hispid, styles terminal.

14. F. lucida, Stapf; stem tall, nodes 2, leaves linear glaucous, sheaths long loose white, panicle 6-7 in. broadly ovate, branchlets very scabrid, lateral pedicels long, spikelets $\frac{4}{5} - \frac{9}{10}$ in. glistening, fig. gls. oblong acute or subobtuse mucronate ξ -7-nerved, tips and margins hyaline, white.

WEST HIMALAYA; GIRWHAL, Jaunsar, in the Deodar forest, alt. 9000 ft., Duthie.

Stem 2-3 ft., rather stout, smooth; internodes 2, elongate. Leaves 6-12 by \(\frac{1}{2} \) in., finely acuminate, flat except the involute scaberulous margins, firm, smooth, glaucous, many-nerved; basal sheaths of innovs. very long, cauline tighter pale glaucous; ligule \(\frac{1}{2} - \frac{1}{2} \) in., white, split to the middle into fine fibres. Panicle very lax; branches simple to beyond the middle, rough, lowest 4 in.; lateral pedicels \(\frac{1}{2} - \frac{1}{2} \) in. Spikelets pale green; rachilla scabrid, internodes \(\frac{1}{10} - \frac{1}{2} \) in.; gl. \(\frac{1}{2} - \frac{1}{2} \) in., ovate, acute or subscute, shortly 1-nerved, hyaline except at the base; II similar, \(\frac{1}{2} - \frac{1}{2} \) in, midrib percurrent, 2 side-nerves very short; fig. gls. \(\frac{1}{2} - \frac{1}{2} \) in., membranous, pale green, scaberulous, side-nerves prominent; palea linear-obloug, obscurely 2-fid, keels scabrid. Lodicules obliquely ovoid. Anthers \(\frac{1}{2} \) in., linear. Ocary with a slightly oblique haspidulous top, styles just below the top.

** Flowers diœcious; innovations intravaginal.

15. F. sibirica, Hack. ex Boiss. Fl. Orient. v. 626; stem sheathed to the top, leaves linear firm, panicle 3-6 in. ovoid or linear, lower branches simple or divided beyond the middle with 1-4 ovate-oblong 4-6-fid. spikelets, flg. gls. \(\frac{1}{3}\)-\(\frac{1}{3}\) in. ovate or ovate-oblong subobtuse scaberulous, margins subcitiolate or denticulate, awnless or tip setiform. F. mutica, Jacquem. mss. Schedonorus transparens, Munro mss. Poa albida, Turcz. ex Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 387; Kunth Enum. Pl. i. 387. P. pallida, Jacquem. mss. Leucopoa sibirica, Griseb. in Ledeb. Fl. Ross. iv. 383, in Goett. Nachr. (1868) 76.—Festuca, n. 3, Herb. H. f. & T.—Schedonorus, n. 2, Herb. Strachey & Winterb.

WESTERN TIBET, alt. 13-15,000 ft., from Ladak to N. of Kumaon.-DISTRIB.

Caucasus, Altai Mts., Dahuria.

Stems 1-2 ft., tufted, erect, smooth. Leaves 6-10 in., rarely more, by $\frac{1}{10}$ - $\frac{1}{7}$ in., linear, finely acuminate, smooth or scabrid, subconvolute, dull green, nerves many very prominent, lower cauline one 3 in.; sheaths of innovs. open to the base, terete, lasal crowded, cauline smooth; ligule very short, membranous, truncate, ciliate. Panicle very narrow or expanded, stiff or flexuous; lower branches solitary or binate, erect or spieading, very variable in length; lateral pedicels very short. Spikelets pale green, $\frac{3}{10}-\frac{1}{10}$ in., very broad when open; rachilla minutely scabrid, internodes $\frac{1}{10}$ in.; gis. thin, 1- $\frac{1}{10}$ - $\frac{1}{10}$, novate to ovate-lanceolate, subacute, 1-nerved or 3-nerved at the very base, white and hyaline except along the green nerve; II about $\frac{1}{1}$ in., similar, but more oblong and usually distinctly 3-nerved; fig. gis.

5-nerved, tip and margins broadly hyaline; palea oblong acute or sub 2-dentate; keels scal-rid. Lodicules obliquely ovate, sometimes 2-lobed. Anthers \(\frac{1}{2}\rightarrow\) in., linear, reduced and empty in the fem. fl. Ovary pyriform, top slightly oblique, hispidulous; styles very short, subterminal; stigmas \(\frac{1}{2}\) in., plumose, more or less filiform in the male fl. Grain \(\frac{1}{2}\) in., linear-oblong, quite free, dorsally subconvex, ventrally flat, hilum reaching rather above the middle.

Sect. II. VULPIA. Annuals (the Indian species). Spikelets subsecund in spiciform or racemiform panicles; pedicels clavate, often very short. Glumes divergent, I minute or 0, II much shorter than the fig., long-awned. Stamens 1-3; anthers very short. Ovary glabrous. Grain linear, adherent to the palea.

16. F. Myuros, Linn. Sp. Pl. 74; panicle elongate branched below base usually embraced by the upper sheath, pedicels half the length of gl. II or longer, gl. I minute, flg. gls. 5-8 as long as their awns, stamens 1-3. Host Gram. Austr. ii. 66, t. 93; Engl. Bot. t. 1412; Knapp Gram. Britt. t. 70; Kunth Enum. Pl. i. 396, Suppl. 330; Ledeb. Fl. Koss. iv. 349. F. Pseudomyuros, Soyer Willem. in Ann. Sc. Nat. Ser. I. vii. (1826) 445. ? F. uniglumis, Griseb. in Goett. Nuchr. (1868) 73 (non Soland.). Vulpia Myuros, Gmel. Fl. Bad. i. 215; Reichb. Ic. Fl. Germ. i. t. 60; C. Koch in Linnea, xxi. (1848) 409; T. Nees Gen. Fl. Germ. Monocot. i. n. 71; Boiss. Fl. Orient. v. 628. V. Pseudo-myuros, Reichb. Fl. Germ. Excurs. 37. Mygalurus caudatus, Link Enum. Hort. Berol. i. 92.

WESTERN HIMALAYA. from Kashmir to Garwhal, alt. 5-9000 ft. WESTERN

TIBET, alt. 9-12,000 ft.-DISTRIB. Europe, N. Asia.

Stem 6-18 in., very slender, leafy, glabrous. Leaves setaceous, upper with rather tunid grooved sheaths embracing the base of the panicle; ligule short, biauricled. Panicle 4-10 in.. strict or flexuous, glabrous or puberulous, rachis and branches smooth or scaberulous, lower branches appressed, upper very short. Spikelets with the awns \(\frac{1}{2} - \frac{1}{4} \) in.; rachilla smooth or ciliolate; gls. I and II subulate; flg. smooth or more or less scaberulous, nerves obscure.—I have seen no specimen of F. uniglumis, Soland. from India, and suspect Grisebach's plant to be E. Myuros.

Sect. III. NARDURUS, Reichb. (Gen.). Spikelets spicate, solitary, sessile on the joints of the rachis or with very short flat pedicels. Glumes divergent, equal or unequal; flg. gls. awned or not. Stamens 3, anthers minute. Ovary glabrous. Grain oblong or subpyriform, obtuse, ventrally concave, glabrous, adherent to the palea.

17. F. tenuiflora, Schrad. Fl. Germ. i. 345; leaves very short filiform subflexuous convolute, spike simple, spikelets secund sessile 3-7-fld., gls. I = \frac{1}{2} II linear-subulate acuminate keeled, flg. gls. linear-lanceolate mucronate or shortly awned smooth or hispidulous. Kunth Enum. Pl. i. 395, Suppl. 330. F. maritima, Linn. Sp. Pl. 75. Nardurus tenuiflorus, Boiss. Voy. Bot. Espan. ii. 667, Fl. Orient. v. 632. N. unilateralis, Fries ex Linnæa, xxix. (1857-8) 730; Fourn. in Bull. Soc. Bot. Fr. xiii. (1866) 181. Catapodium unilaterale, Griseb. in Ledeb. Fl. Ross. iv. 347. Triticum hispanicum, Willd. Sp. Pl. i. 479. T. maritimum, Willd. l.c. (in Syn.). T. Nardus. DC. Fl. Franc. iii. 87. T. tenellum, Viv. Ann. Bot. i. II. 154; Host Gram. Austr. ii. 20, t. 86 (excl. Syn.). T. unilaterale, Linn. Mant. i. 35. Brachypodium tenuiflorum & tenellum, Roem. & Sch. Syst. ii. 745 (ex Kunth).

KASHMIE; near Sirinagur, alt. 5-6000 ft., Duthic.—Distrib. Westwd. to Spain. Stems 8-16 in., tufted, slender, wiry erect, strict or curved, smooth. Leaves

1-3 in., erect, sometimes almost capillary, grooved between the prominent ribs, ligule 0. Spike 2-4 in., short or curved, rachis smooth, wiry, grooved, \(\frac{1}{2}\)- terete, with a shallow groove opposite the spikelets. Spikelets \(\frac{1}{2}\)-\(\frac{1}{2}\) in., green; fl. gls. rigid, terete, nerves indistinct. Lodicules subcuneate, acutely 2-lobed.

DOUBTFUL SPECIES.

F. filiformis, Nees en Duthie Grass. N.W. Ind. 42 is probably a Tripogon.

122. BROMUS, Linn. (O. Stapf).

Annual or perennial grasses. Leaves narrow, usually flat. Spikelets many-fld., panicled, laterally compressed; uppermost fls. usually imperfect; rachilla jointed below the flg. gls., not produced beyond the uppermost gl. Glumes many, I and II unequal, empty, acuminate, 1-5-nerved, persistent, flg. gls. acuminate or shortly cleft; 1- very rarely 3-awned, median awn erect or recurved sometimes twisted towards the base; palea 2-fid or 2-toothed, keels scabrid or ciliate. Lodicules 2, oblong or lanceolate, entire or cleft. Stamens 3. Ovary oblong or cuneiform, crown more or less enlarged and hairy or villous. Styles usually inserted ventrally below the tip of the ovary, short; stigmas plumose. Grain linear-oblong, usually concavo-convex and adherent to the palea.—Species about 40, natives of temp. regions.

B. untoloides, H. B. K. (B. Schraderi, Kunth; Duthie Grass. N.W. Ind. 43; Fodd. Grass. N. Ind. 67), a tall American species with many nerved keeled gls. has been introduced into India as a fodder grass, and has been found at Darjiling and elsewhere as an escape.

Sect. I. FESTUCOIDES, Coss. & Dur. Perennial, usually tall. Gl. I 1-nerved; II 3-nerved; fig. gls. 5-7-nerved; awn terminal or nearly so or 0.

1. B. inermis, Leyss. Fl. Hall. 16; rootstock creeping, panicle large, spikelets up to 2 in., awn of fig. gls. minute or 0. Poll. Hist. Pl. Palat. i. 111; Schreb. Beschr. Graes. i. 97, t. 13; Host Gram. Austr. i. 8, t. 9; Kunth Enum. Pl. i. 412, Suppl. 340; Ledeb. Fl. Ross. iv. 357; Steud. Syn. Gram. 321; Boiss. Fl. Orient. v. 642. B. littoreus, Georgi Beschr. Russ. Reich. Nachtr. 257; Griseb. in Goett. Nachr. (1868) 74; Duthie Grass. N.W. Ind. 43. B. purpurascens, Turcz. ex Ledeb. l. c. PB. variegatus, Griseb. l. c. (non Bieb.). Schedonorus inermis, Beauv. Agrost. 99. Festuca inermis, DC. Fl. Fr. iii. 49; Reichb. Ic. Fl. Germ. t. 70. F. Leysseri, Moench Enum. Pl. Hass. 41. F. poseoides, Thuill. Fl. Paris, Ed. 11. 51. F. poseformis, Pers. Syn. ii. 94. F. speciosa, Schreb. Spicil. Fl. Lips. 59. Tragus inermis, Panz. in Denkschr. Akad. Muench. (1813) 296.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 9-13,000 ft.—DISTRIB.

N. Europe, Reg. Caucas., N. Asia.

Stem 2-4 It., often stoloniferous, nodes usually pubescent. Leaves 6-9 by \(\frac{1}{2}\)-\frac{1}{2}\) in., finely acuminate, glabrous or hairy above, smooth or scaberulous beneath, many-nerved; sheaths tight, striate; ligule very short, truncate, toothed. Fasicle 6-8 in., open or contracted, erect or nodding, rachis smooth; lower branches 2-5 in., 3-4-nate, simple or sparingly divided. Spikelets pale green, rarely purplish, linear-oblong, loosely 5-12-fid., rachilla pubescent; gl. I \(\frac{1}{2}\)-\frac{1}{2}\) in., lancolate, keeled; II \(\frac{1}{2}\)-\frac{1}{2}\) in., oblong-lanceolate, subacute; fig. gls. \(\frac{1}{2}\)-\frac{1}{2}\) in., oblong-lanceolate, obtuse, 5- sub 7-nerved, glabrous or nearly so, tip and upper margins scarious; awn up to \(\frac{1}{2}\) in.; keels of palea rigidly ciliolate. Anthers \(\frac{1}{2}\)-\frac{1}{2}\) in. Grain \(\frac{1}{2}\)-\frac{1}{2}\] in., oblong, more or less folded.—B. inermis in N.E. Asia passes into B. ciliatus, L., a characteristic form in N. America where B. inermis is absent.

Var. villosus, Mert. & Koch in Röhl. Deutsch. Flor. i. 675; spikelets pubescent to villous, lower sheaths and leaves more or less hairy.—Kashmir and Gilgit.

Europe.

Var. confinis, Stapf; stem 1½-2½ ft., leaves hardly ½ in. broad hairy, panicle usually reduced to a ruceme, spikelets densely pubescent. B. confinis, Nees ex Steud. Syn. Gram. 320; Duthie l. c. 42. B. pubescens, Jacquem. mss. B. Munroi, Boiss. Fl. Or. v. 643.—Kunawur and Gilgit.

2. B. asper, Murray Prodr. Stirp. Gotting. 42; rootstock short premorse, panicle large, spikelets up to 1½ in.. awn of fig. gls. ½ to nearly as long as the gl. straight. Host Gram. Austr. i. 6, t. 7; Engl. Bot. t. 1172; Beichb. Ic. Fl. Germ. t. 76; Steud. Syn. Gram. 320; Ledeb. Fl. Ross. iv. 356; Boiss. Fl. Orient. v. 643; Griseb. in Goett. Nachr. (1868) 64; Duthie Grass. N. W. Ind. 42. B. altissimus, Weber in Wigg Prim. Fl. Holsat. 9 (non Pursh.). B. dumetorum, Lamk. Fl. Fr. iii. 605. B. giganteus, Vill. Hist. Pl. Dauph. ii. 118 (non Linn.). B. hirsutissimus, Cyrill. ex Roem. § Sch. Syst. ii. 643. B. hirsutus, Gurt. Fl. Lond. fasc. ii. t. 8 (non Schrank.). B. montanus, Scop Fl. Carn Ed. II. i. 82. B. nemoralis, Huds. Fl. Angl. Ed. II. i. 51. B. nemorosus, Vill. l. c. 218. B. Pseudo-asper. Schur. Enum. Pl. Transs. 804. B. ramosus, Huds. Fl. Angl. 40 (non Linn.). B. serotinus, Benek. in Bot. Zeit. iii. (1845) 724; Steud. l. c. Festuca aspera, Mert. § Koch in Roehl. Deutsch. Flor. i. 672. F. scaberrima & Wightiana, Steud. l. c. 316. Schedonorus asper, Gaud. ex Roem. § Sch. l. c. S. Benekeni, Lange in Fl. Dan. t. 2826. S. serotinus, Rostoup in Kjoeb. Vidensk. Meddel. (1864) 119. S. bromoides, Wight § Ann. in Wight Cat. n. 1795.—Bromus, n. 10 (partim), Herb. Ind. Or. Hf. & T.

TEMPERATE HIMALAYA, alt. 6-11,000 ft., from Kashmir to Sikkim. KHASIA HILLS, alt. 5000 ft., J. D. H. and T. T., Clarks. NILGHIEI and PULNEY HILLS, Wight; alt. 7000 ft., Clarks.—DISTRIB. Europe, N. Afr., W. and N. Asia.

Stems 2-6 ft., erect, smooth. Leaves 1-1\frac{1}{2} ft. by \frac{1}{6}-\frac{1}{2} in., finely acuminate, flaccid, hairy above, beneath and margins scabrid, nerves many; sheaths villous or retrorsely hirsute, upper glabrous; ligule short, obtuse, ciliolate. Panicle up to 1 ft., loose, open or contracted, rachis rough or smooth below; branches 2-nate or lower 3-5-nate and unequal up to 7 in., spreading or deflexed, naked below. Spikelets linear to oblong, green, loosely 7-9-fld.; gls. rather firm; rachilla scabrid; gl. I \frac{1}{6}-\frac{1}{6} in., linear-lanceolate; II \frac{1}{4}- nearly \frac{1}{6} in., broader, more oblong; III \frac{1}{6}- nearly \frac{1}{6} in., bloong-lanceolate, keeled below the tip, glabrous pubescent scabrid or side nerves, scabrid to ciliate. 5-7-nerved, tip and margin more or less hyaline; awn terminal or subterminal; palea obtuse, keels rigidly ciliate. Anthers \frac{1}{3}-\frac{1}{6} in., linear. Grain \frac{1}{3} in., linear-oblong, flat tightly adherent to the gl. and palea. - The Sikkim, Khasia and some Nilghiri specimens have more acute and strongly nerved gls. than most of the N.-Western ones; but they are linked by many intermediates, and similar variations occur all over Europe.

3. **B. himalaicus**, Stapf; rootstock very short, panicle usually reduced to a raceme, spikelets up to 1 in., awn of fig. gl. as long as the gl. or longer recurved. B. asper, & Bromus n. 9 & 10 (partim), Herb. Ind. Or. Hf. & T.

TEMPERATE HIMALAYA; E. Nepal, Sikkim and W. Bhotan, &c., alt. 8-12,000 ft., J. D. H.

Stems 2-2½ ft. Leaves 6-9 by $\frac{1}{4}-\frac{1}{4}$ in., finely acuminate, flaccid, hairy above, beneath and margins scabrid, many-nerved; sheaths tight, glabrous or lowest hairy when young; ligule short, truncate, usually dark colrd. Panicle 5-7 in., open or contracted; rachis rough, or smooth below; branches 2-nate, or the lower 3-5-nate, spreading or deflexed, unequal, lowest up to 8 in., simple or sparingly divided. Spikelets linear-oblong, green, loosely 9-fid.; rachills subscaberulous; gl. I $\frac{1}{4}-\frac{7}{16}$ in., narrowly lanceolate, 1-nerved, keeled; II longer ($\frac{3}{16}-\frac{1}{4}$ in.) and broader;

III broader and thinner than in B. asper, glabrous pubescent or rigidly hairy towards the margins, 5-7-nerved, scarcely keeled below the tip, tip and margins hardly hyaline; callua large; palea obtuse, keels rigidly ciliate. Anthers linear-oblong, $\frac{1}{20-18}$ in. Grain $\frac{1}{8}$ in., linear-oblong, plano-convex, adherent to the gl. and pulea.

Var. grandis, Stapf; branches of panicle almost all simple and bearing a solitary villous spikelet, gls. larger. B. confinis, Herb. Strach. & Winterb.

-Kumaon and Sikkim, alt. 11-12,000 ft.

Sect. II. Stenobromus, Griseb. Annuals. Gl. I 1- rarely 3-nerved; II 3-5-nerved; flg. gls. 5-7-nerved; internodes of rachilla slender.

4. B. crinitus, Boiss. & Hoh. in Boiss. Diagn. Ser. I. xiii. 64, Fl. Orient. iii. 647; panicle rather stiff, spikelets \(\frac{1}{2}\) in. elliptic-oblong, flg. gls. clavate not imbricating. Steud. Syn. Gram. 320; Griseb. in Goett. Nachr. (1868) 74. B. gracillimus, Bunge in Mem. Sav. Etr. Petersb. vii. (1851) 527; Duthie Grass. N.W. Ind. 42. Deschampsia aralensis, Regel in Bull. Soc. Nat. Mosc. xli. (1868) II. 300.

WESTERN TIBET; alt. 10-14,000 ft.; Baltistan, &c., Thomson, Duthie. Zauskar; Schlagintweit. BRITISH BELUCHISTAN, alt. 4-5000 ft., Duthie.—DISTRIB. Westwd.

to Persia, Turkestan.

Stem 6-18 in., erect, slender, smooth. Leaves $1\frac{1}{4}-3\frac{1}{4}$ by $\frac{1}{12}-\frac{1}{10}$ in., linear, flaccid, pilose or velvety; sheaths velvety; ligule ovate, lacerate. Panicle up to 4 in., oblong, erect or subnutant, rachis smooth; branches 3-5-nate, capillary, suberect or spreading, up to 2 in. Spikelets 3-6-fld., pale green; racbilla scabrid; gl. I \(\frac{1}{7} \) in., lunocolate, acute, hyaline except along the middle; II \(\frac{1}{7} - \frac{1}{7} \) in., broadly lanceolate, tip and margins hyaline; flg. gls. \(\frac{1}{7} \) in., oblong, obtuse, strongly involute, ciliate on or near the margin, faintly 5-nerved; awn \(\frac{1}{7} \) in., capillary, straight, terminal or nearly so; keels of palea ciliate. Anthers \(\frac{1}{7} - \frac{1}{7} \) in. Grain \(\frac{1}{7} \) in., linear-oblong, laterally compressed and folded; bilum as long as the grain.

5. B. tectorum, Linn. Sp. Pl. 77; paniele flaccid nodding often secund, spikelets \(\frac{1}{2}\)-1 in. cuneiform, flg. gls. long narrow. Host Gram. Austr. i. 13, t. 15; Sibth. Fl. Græc. i. t. 82; Fl. Dan. t. 1806; Reichb. Ic. Fl. Germ. t. 73; Ledeb. Fl. Ross. iv. t. 359; Kunth Enum. Pl. i. 419, Suppl. 344; Boiss. Fl. Orient. v. 647; Steud. Syn. Gram. 318; Griseb. in Goett. Nachr. (1868) 74; Duthie Grass. N.W. Ind. 43. B. abortiflorus, St. Amans. Fl. Agen. 44; Steud. l. c. B. arenaceus, Pourr. in Mem. Acad. Toul. iii. (1788) 308. B. lateripronus, St. Laz. in Ann. Soc. Bot. Lyon. vii. (1880) 121. PB. scabrifolius, Opis. Natural. n. 9 (1825) 119. B. tectoriu, Dulac Fl. Haut. Pyren. 96. Anisantha pontica, C. Koch in Linnæa, xxi. (1848) 394; Steud. l. c. 377.

WESTERN HIMALAYA, from Gilgit to Kumaon, alt. 7-11,000 ft.; Baltistan,

Duthie.—DISTRIB. Europe, N. Africa, N. and W. Asia.

Stems 6-18 in., erect or ascending, glabrous or pubescent. Leaves up to 3 by in., linear, acute, flaccid, hairy; sheaths hairy, rarely glabrous; ligule ovate, incerate. Panicle-up to 5 in., flaccid; rachis smooth or nearly so; branches 3-6-nate, capillary, flexuous, often decurved with erect tips, sparingly divided. Spikelets green, loosely few-many-fld., rachilla scabrid; gl. 1 \(\frac{1}{4}\)-\(\frac{1}{2}\) in., lanceolate, acute, 1- rarely 3-nerved, tip and margins hyaline; II \(\frac{1}{2}\)-\(\frac{1}{2}\) in., oblong-lanceolate, 3-5-nerved; flg. gls. \(\frac{1}{2}\)-nearly \(\frac{2}{3}\) in., thin, oblang-lanceolate, acutely 2-fld, 5-7-nerved, puberulous or scabrid above or all over, tip and margins hyaline; awn \(\frac{1}{2}\)-\(\frac{1}{4}\) in., from the tip or below it, straight or slightly recurved; keel of palea long and loosely ciliate. Anthers \(\frac{1}{2}\) in. Grain \(\frac{1}{2}\)-\(\frac{1}{4}\) in., linear-oblong, dorsally compressed, ventrally concave or folded.—The form with a solitary flg. gl. (B. abortiftorus, St. Amans) may be expected to occur in N. India.

Sect. III. Serrafalcus, Parl. (Gen.) Annuals. Gl. I 3-5- rarely 1-nerved; II 5-9-nerved; fig. gls. 7-9-nerved; internodes of rachilla clayate above.

- * Flg. gls. all 1-awned. Panicle compact, rarely loose, branches short.
- 6. B. scoparius, Linn. Cent. Pl. i. 6, Sp. Pl. 76; panicle very compact oblong to obovate, spikelets densely fascicled about $\frac{1}{3} \frac{1}{3}$ in., fig. gls. oblong obtuse, awn = the gl. at length spreading. Kunth Enum. Pl. i. 420; Bory Exped. Morée, t. 5; Steud. Syn. Gram. 318; Boiss. Fl. Orient. v. 650. B. confertus, Bieb. Fl. Taur. Cauc. i. 71; Steud. l. c. 324; Duthie Grass. N.W. Ind. 42. B. chryspopogon, Viv. Fl. Lyb. Spec. 4, t. 2; Steud. l. c. 327. B. erectus, Moris Stirp. Sard. Elench. i. 50 (non Huds.). B. humilie, Cav. Ic. vi. 65, t. 589. ?B. rubens, Cav. l. c. t. 45 (non Linn.). Serrafalcus scoparius, Parl. Fl. Ital. i. 19. S. Cavanillesii, Willk. & Lange Prodr. Fl. Hip. i. 101.

Kashmir, alt. 5-6000 ft., Falconer, Duthie.—Distrib. Reg. Mediterr., Oriens. Annual. Stems \(\frac{1}{2} \) \(\frac{1}{2} \) ft., erect, slender, glabrous. Leaves 2-3\(\frac{1}{2} \) in. by \(\frac{1}{2} \) in., linear, seute, hairs scattered stiff; sheaths tight, glabrous, mouth hairy; ligule short, truncate, toothed. Panicle 1-1\(\frac{1}{2} \) in., erect, compact; ruchis smooth; branches solitary or binate, short, crowded, scaberulous. Spikelets \(\frac{1}{10} - \frac{1}{2} \) in. broad, pale green, densely 5-8-fid., rachilla scaberulous; glumes glabrous or hairy, norves strong; gl. I \(\frac{1}{2} \) in., ovate-lanceolate, acute or subacute, 8-5-nerved; II \(\frac{1}{2} \) in., 5-7-nerved; flg. gls. \(\frac{1}{2} \) in., minutely 2-fid, 7- sub 9-nerved; awn slender; keels of obtuse palea loosely long-ciliate. Anthers \(\frac{1}{20} - \frac{1}{40} \) in. Grain \(\frac{1}{20} \) in., linear-oblong, flatly concavo-convex or folded.

7. B. mollis, Linn. Ep. Pl. Ed. II. 112; panicle compact or loose but contracted ovate to oblong branches distinct, spikelets \(\frac{1}{2} - \frac{3}{4} \) in. ovate-oblong or elliptic, awn about as long as the gl. straight. Host Gram. Austr. i. 16, t. 19; Fl. Dan. t. 1324; Engl. Bot. t. 1078; Knapp Gram. Britt. t. 77; Reichb. Ic. Fl. Germ. t. 74; Schreb. Beschr. Gram. t. 6, f. 1; Kunth Enum. Pl. i. t. 413, Suppl. 340; Steud. Syn. Gram. 323; Ledeb. Fl. Ross. iv. 361; Steud. Syn. Gram. 323; Boiss. Fl. Orient. v. 653; Duthie Grass. N.W. Ind. (Royle's plant only) B. arenarius, Thomine Deem. in Mem. Soc. Linn. Calv. (1824) 40 (non Labill.). B. atticus, Steud. ex Nym. Consp. 823; Syn. Gram. 321. B. compactus, Hort. ex Steud. Nom. Ed. II. ii. 227. B. Ferronii, Mabelli in Act. Soc. Linn. Bord. xxv. (1864) 613. B. glomeratus, Tausch in Flora, xx. (1837) 125 (ex Boiss.); Steud. l. c. 328. B. hordeaceus, Linn. Sp. Pl. 77. B. nauus, Weig. Obs. 8. B. patulus, Duthie Grass. N.W. Ind. 42 (in part). B. simplicissimus, Cesati ex Nym. l. c. Serrafalcus mollis, Parl. Rar. Pl. Sic. ii. 16. S. Thomini, Hard. in Congr. Sc. Fr. Septr. I. (1833) 59.

NORTH-WEST INDIA, Herb. Royle (Introd.?).—DISTRIB. Europe, N. Afr., As. Min.

Annual. Stems \(\frac{1}{4}\)-3 ft., erect or ascending, villous to glabrous. Leaves \(\frac{1}{4}\)-4 in., linear, acute, flaccid, subhirsute above, pubescent beneath; sheaths velvety or softly hairy; ligule very short, denticulate, glabrous or hairy. Panicle \(1-6\) in., erect, rachis hairy; branches \(3-6\)-6-nate, scabrid or softly pubescent. Spikelets \(\frac{1}{4}\)-\(\frac{1}{4}\) in. broad, pale green, densely \(5-12\)-fid., rachills scaberulous; gls. broad, hairy to velvety, rarely glabrescent, nerves strong, tips and margins scarious; \(1\)\(\frac{1}{4}\)\(\frac{1}{4}\)\(\frac{1}{6}\)\(\frac{1}{1}\) in., ellipticoblong, \(7-9\)-erved; fig. gls. \(\frac{1}{10-\frac{1}{2}}\) in., broadly subobovate, obtuse, shortly \(2\)-lobed, \(7\)-nerved; awn subterminal as long or rather shorter than the gl.; palea obtusely

- 2-lobed, keels loosely long-ciliate. Anthers $\frac{1}{2}$ in., oblong. Grain $\frac{1}{6}$ $-\frac{1}{4}$ in., linearoblong, flatly concavo-convex or folded, tightly adherent to the gl. and palea.
- ** Flg. qls. all 1-awned, or some 3-awned in B. macrostachys. Panicle loose, open or contracted.
- 8. B. patulus, Mert. & Koch in Röhl, Deutsch. Flor. i. 685; panicle linear-oblong usually nodding often secund branches long slender up to 6 in., spikelets 3-12 in. linear-oblong, awn about = the gl. usually recurved. Kunth Enum. Pl. i. 415; Reichb. Ic. Fl. Germ. t. 74; Ledeb. Fl. Ross. iv. 364; Boiss Fl. Orient. v. 655; Steud. Syn. Gram. 325; Grisch. in Goett. Nachr. (1868) 74; Duthie Grass. N.W. Ind. 43. B. annuus, Herb. Jacquem. B. anatolicus, Boiss. et Heldr. in Boiss. Diagn. Ser. 1. xiii. 63. B. arvensis, Duthie l.c. 42 (non Linn.); Herb. Ind. Or. Hf. & T. B. chapprianus, De Not. ex Nym. Consp. 824. B. commutatus, M. Bieh. Fl. Taur. Cauc. iii. 77 (non Mert. & Koch.). B. Cyri, C. A. Mey. Verz Pfl. Cauc. 24. B. japonicus, Thunb. Fl. Jap. 51, t. 11; Franch. & Sav. Enum. Pl. Japon. ii. 181 (nom. prius). B. Kochii, C. Gmel. Fl. Bad iv. 76, t. 6. B. mollis, Duthie l. c. B. multiflorus, Host Gram. Austr. i. (excl. exempl. Royle) t. 11 (nom Sm.). B. pendulus, Schk. in Verh. Siebend. Ver. Naturn. iv. (1853) 90. B. phrygius, Boiss. Diagn. Ser II. iv. 140. B. polymorphus, Hoh. Enum. Pl. Talusch. 19. B. secalinus, M. Bieb. l. c. i. 71 (non Linn). B. squarrosus, Herb. Royle; Herb. Strach. & Winterb. (Bromus, n. 3): Duthie l.c. (non Linn.). B. unilateralis, Schur. l.c. B. velutinus, Nocc. et Balb. Fl. Tic. i. 54 (non Schrad.). B. villiferus, Steud. Syn. Gram. 326 (in part). Serrafalcus patulus, Parl. Fl. Ital. i. 394.

WESTERN HIMALAYA, alt. 6-14,000 ft. Bhotan, Griffith.—DISTRIB. Europe,

W. and N. Asia, China, Japan.

Annual. Stems 1-2 ft., erect or ascending, glabrous or puberulous. Leaves up to 8 by 1 in., linear, acute or subacute, green, flaccid, hairy especially above; sheaths rarely all glabrous or hairy; ligule short, ovate, toothed. Paniele up to 8 in., narrow or open; rachis glabrous or pubescent; branches solitary or 3-7-nate, unequal, 1-4-spiculate, slender, flexuous, lower up to 6 in. long, simple or racemose, suberect spreading or nodding, scabrid at least above. Spikelets densely or loosely 7-14-fid., pale green; rachilla scabrid; gls. rather narrow, thin between the prominent nerves; I 1 in., lanceolate, subscute, pubescent or scabrid, 3-nerved, tips and upper margins hyaline, II 3-1 in., oblong-lanccolate, 7 nerved; flg. gls. 1 4 in., elliptic-oblong or lanceolate, subacute or obtuse, 2-toothed, margins inflexed from the middle or above it; awn $\frac{1}{10} - \frac{1}{4}$ in., infra-apical, base rather stout, not or obscurely twisted; keels of palea loosely long-ciliate. Anthers $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$ in. Grain 1-4 in. linear-oblong, more or less concavo-convex, tightly adherent to the gl. and palea .- Griffiths' Bhotan specimen is a solitary one, probably introduced. The following are rather abnormal forms than varieties.

Var. Falconeri, Stapf; panicle very loose villous, gl. I narrowly lanceolate 1-nerved, II 5-nerved, fig. gls. 7-nerved .- B. tomentellus, Duthie l. c. 43 (non

Boiss,) .- N.W. India, Falconer.

Var. microstachya, Stapf.; spikelets small few-fld., gl. broader, I & in. 3 5nerved, II 1 in. 7-9-nerved, fig. gls. 1-10 by 1 in. broad.—N.W. India, Falconer.

9. B. oxyodon, Schrenk Enum. Pl. Nov. ii. 1; panicle usually stiff suberect oblong contracted, branches up to 2 in., spikelets 11 in. linear or linear-oblong, fig. gls. broadly hyaline awn 3-1 in. Stend. Syn. Gram. 326. B. macrostachys, var. oxyodon, Griseb. in Ledeb. Fl. Ross. iv. 363. B. multiflorus, Kar. & Kiril. in Bull. Soc. Nat. Mosc. (1841) 865.

KASHMIR, DRAS, BALTISTAN, ZANSKAB, &c., alt. 9-12,000 ft., Thomson, &c .--DISTRIB. - Turkestan.

Annual. Stems 6-18 in., erect or ascending, pubescent or subvelutinous. Leanes 2-5 in., linear, narrow, subacute, hairy or velvety; young sheaths villous; ligule ovate, lacerate. Panicle up to 5 in., usually contracted, erect, rachis pubescent; branches 2-5-nate, unequal, suberect, rarely nodding, scabrid, simple 1-3-spiculate. Spikelets pale green, densely 5-10-fid.; rachilla puberulous; gls. rather narrow, glistening, scabrid with appressed hairs, tips long-hyaline, nerves prominent; I $\frac{1}{2}-\frac{3}{2}$ in., lanceolate, 1-3-nerved; II, $\frac{9}{20}-\frac{1}{20}$ in., oblong-lanceolate, 5-nerved; fig. gls. $\frac{1}{2}-\frac{3}{2}$ by $\frac{1}{2}-\frac{1}{2}$ in., oblong-lanceolate, margins inflexed below the middle, subacute, 2-toothed, 7-9-nerved; awn $\frac{3}{2}-1$ in., infra-apical, nearly straight or moderately recurved; keels of palea loosely long-ciliate. Anthers $\frac{3}{10}-\frac{3}{2}$ in. Grain $\frac{3}{2}-\frac{1}{2}$ in., linear-oblong, slightly concavo-convex.

10. B. macrostachys, Desf. Fl. Atlant. i. 96, t. 19, f. 2, var. triaristatus, Hack. in Flora (1879); panicle oblong or obovate-oblong loose or contracted, spikelets $1\frac{1}{2}-1\frac{3}{4}$ in. elliptic to linear-oblong, fig. gls. all or the upper only with 2 straight slender lateral awns, median awn $\frac{1}{6}-\frac{3}{4}$ in. finally twisted and strongly recurved. B. Danthoniæ, Trin. in C. A. Mey. Verz. Pfl. Cauc. 21; Sp. Gram. Ic. t. 353; Duthie Grass. N.W. Ind. 43. Bisisiera Danthoniæ, A. Br. Ind. Sem. Hort. Berol. (1857) 3. Triniusa Danthoniæ, Steud. Syn. Gram. 328.

WESTERN TIBET; Spiti, alt. 12,000 ft., Lance .- DISTRIB. Affghan., Turkestan,

As. Min. (of B. macrostuchys, M. diterranean regions, Persia).

Annual. Stem 6-18 in., erect or ascending, glabrous or pubescent. Leaves 2-6 in., narrowly linear, acute or subacute, more or less hairy or velvety; young sheaths villous or velvety; ligule ovate, lacerate. Panicle up to 5 in., sometimes reduced to a spikelet, rachis glabrous or pubescent; branches solitary or the lower 3-4-nate, unequal, rarely 1 in., simple, 1-2-spiculate, strict, suberect, scabrid, rarely flexuous. Spikelets pale green, densely 6-20-fld.; rachilla pubescent; gls. broad, villous velvety or scabrid, tips and margins usually scarious and dull white, nerves prominent or not; gl. I $\frac{1}{2}$ in.; broadly lanceolate, 5-nerved; II about $\frac{1}{2}$ in., oblong, 7-9-nerved; flg. gls. $\frac{1}{2}$ -nearly $\frac{1}{2}$ in., elliptic to obovate-oblong, subacute, 2-toothed, 9-11-nerved, margins inflexed from or from above the middle; lateral awns $\frac{1}{2}$ in, median $\frac{1}{2}$ in, infra-apical, often purplish, base stout; keels of palea long-ciliate. Anthers nearly $\frac{1}{2}$ in., rarely $\frac{1}{2}$ 0 in. Grain $\frac{1}{10}$ 0 in., linear-oblong, slightly concavo-convex, tightly adherent to the gl. and palea; hillum almost as long as the gl.

DOUBTFUL SPECIES.

B. MEMBEANACEUS, Jacquem. m.s.; Griseb. in Goett. Nachr. (1868) 74 Duthie Grass. N.W. Ind. 43 is Duthiaea bromoides, Hack. (see p. 282).

123. DUTHIEA, Hack. See p. 282.

124. BRACHYPODIUM, Beauv.

Perennial slender grasses. Leaves flat or convolute. Spikelets terete, many-fld., subsessile or in a long slender spike appressed to the rachis; rachilla elongate and jointed below the fl. gls. Glumes many, imbricate in fl., spreading in frt.; 1 and 11 persistent; empty, narrow; flg. gls. oblong-lanceolate, acuminate, with a terminal straight awn or mucro, 7-9-nerved; keels of palea pectinately ciliate. Lodicules ciliate. Stamens 2-3, authors linear. Ovary and grain as in Bromus.—Species 5 or 6, of north temp. and mt. regions.

1. B. sylvaticum, Beauv. Agrost. 101; roots fibrous, leaves more or less hairy or scaberulous flat, spike drooping, awn as long as its gl. Thw. Enum. Pl. Zeyl. 374; Trim. Cat. Ceyl. Pl. 110; Ledeb. Fl. Ross. iv. 346;

Boiss. Fl. Orient. v. 657. B. Fontanesianum, Nees Fl. Afr. Austr. 457. B. Fontanesii, Ness in Herb. Ind. Or. Hohenack. n. 914. B. gracile, Beauv. I. c.; Reichb. Ic. Fl. Germ. t. 16. B. nepalense, Nees ex Steud. Syn. Gram. 316. B. scaberrimum, Wight & Arn. in Wight Cat. n. 1796; Steud. Nomencl. Ed. II. i. 221. Bromus silvaticus, Pollich Hist Pl. Palat. i. 118; Host Gram. Austr. i. 17, t. 21; Engl. Bot. t. 729. B. dumosus, Vill. Hist. Pl. Dauph. ii. 119. B. gracilis, Weig. Obs. 15, t. 1, f. 11. B. pinnatus, Fl. Dan. t. 164 (non Beauv). Festuca gracilis, Moench Meth. 191. F. svlvatica, Huds. Fl. Angl. Ed. I. 38; Knapp Gram. Britt. t. 76; Steud. Syn. Gram. 316. Triticum sylvaticum, Moench Enum. Pl. Hass. 54; Kunth Enum. Pl. i. 415. T. gracile, Brot. Fl. Lusit. 121. T. scabernum, Steud. Nom. l.c. 717. Tragus gracilis, Panz. in Denkschr. Akad. Muench. (1813) 296.—Festuca, Wall. Cat. n. 3800.

TEMPERATE HIMALAYA, alt. 6-12,000 ft., from Kashinir to Sikkim. The Khasia and Naga Hills, alt. 4-6000 ft., Clarke, &c. Nilghiri Hills, alt. 6000 ft., Wight, &c.—Ceylon, alt. 8000 ft., Walker, &c.—Distrib. Europe, N. Asia, S. Africa.

Stem 2-4 ft., very slender, simple or branched. Leaves \(\frac{1}{3}-\frac{2}{3}\) in. broad, usually flaccid, finely acuminate; sheaths more or less hairy; ligule short, obtuse. Spikes 2-6 in., or more, nodding; rachis compressed, glabrous, edges ciliolate. Spikelets 8-18 by \(\frac{2}{3}-1\) in., green, glabrous sparsely hairy or scabernlous, nerves strong; gl. I and II strongly nervel; I subulate, \(\frac{1}{2}\) shorter than II or less; II oblong-lanceolate, acute acuminate or shortly awned; fig. gls. about \(\frac{1}{2}\) in. long, gradually narrowed into a slender erect awn, 7-nerved; awn \(\frac{1}{2}-\frac{1}{2}\) in. Anthers \(\frac{1}{2}-\frac{1}{2}\) as long as the palea.— The characters of the following varieties are far from constant.

Var. longe-aristatum, Hook. f.; flg. gl. \(\frac{1}{2}\) in., awns \(\frac{1}{2}-\frac{3}{4}\) in.—N.W. Himalaya; Kumaon and Dalhousie, alt. 6-9000 ft.

Var. khasianum, Hook. f.; callus of fl. gl. villous awn up to 1½ in.—Khasia Hills. Var. Wattii. Hook. f.; stem stouter, lower spikelets pedicelled, pedicel of lowest half as long as the spikelet or less pubescent, awn about as long as the gl. B. Wattii, Clarks in Journ. Linn. Soc. xxv. (1887) 90, t. 40.—Naga Hills, alt. 5500-7500 ft., Clarks.

Var. Pseudo-distactyon, Hook. f.; stem short 10-18 in. strict, leaves very narrow erect, spikelets few closer together, awn = half the gl. or shorter.—Kashmir and Kumaon.

. 2. B. pinnatum, Beauv. Agrost. 101, t. 19, f. 3; rootstock creeping, leaves convolute, spike erect, fig. gls. mucronate. Ledeb. Fl. Ross. iv. 345; Boiss. Fl. Orient. v. 658; Reichb. Ic. Fl. Germ. t. 16, 17; T. Nees Gen. Fl. Germ. Monocot. i. t. 70. B. Barrelieri, Roem. & Sch. Syst. ii. 741. B. cospitosum, Roem. & Sch. l. c. 737; Reichb. l. c. t. 17; Host Gram. Austr. i. t. 22. B. constrictum, Presl Cyp. & Gram. Sic. 40. B. corniculatum, DC. Fl. Franc. v. 608. B. rupestre, Roem. & Sch. l. c. 736; Host l. c. iv. t. 17, 18. Bronus gracilis, Leys. Fl. Hal. 26. B. pinnatus, Linn. Sp. Pl. 78; Host Gram. Austr. i. t. 22; Engl. Bot. t. 730. Festuca pinnata, Moench. Meth. 191; Huds. Fl. Angl. Ed. II. i. 48; Knapp. Gram. Britt. t. 75. Triticum bromoides, Weber ex Wigg. Prim. Fl. Holsat. ii. T. gracile, DC. Fl. Fr. iii. 84. T. macrourum, Turc. in Bull. Soc. Nat. Mosc. (1838) 105. T. phomicioides, DC. l. c. vi. 284. T. pinnatum, Moench Enum. Pl. Hass. 53; Kunth Enum. Pl. i. 445, Suppl. 364, t. 35. Tragus pinnatus, Panz. in Denkschr. Acad. Muench. (1813) 256. Avena laeta, Salisb. Prodr. 22.

KASHMIR; alt. 6000 ft., Clarke.—DINTRIB. Eastwd. to Europe, N. Asia.

Glaucous. Stein 1-3 ft., very slender, naked above, smooth. Leaves rigid, almost glabrous, rarely flat; ligule ciliate. Spike 1-6 in.; rachis flattened, smooth.

Spikelets $\frac{a}{4}-1\frac{1}{2}$ in., erect, recurved from the rachis, glabrous or pubescent, green and purplish. Glumes coriaceous; I 5-nerved; II 7-nerved; fig. gls. oblong, mucronate, 5-nerved.

Tribe X. HORDEE. (See p. 8.)

125. LOLIUM, Linn

Erect annual or perennial grasses. Leaves flat or convolute. Spikelets many-fld., solitary, sessile in the alternating distichous hollows of a terminal inarticulate spike, with the back of the lowest fl. gl. towards the rachis, rachilla jointed. Glumes many, 10, except in the terminal spikelet; II erect, rigid, persistent, many-nerved, empty, margins not involute; flg. shorter than the empty, oblong, obtuse, acute or awned, dorsally rounded. 5- many-nerved; keels of palea ciliolate or serrulate. Lodicules 2, fleshy. Stamens 3. Ovary glabrous; styles terminal, feathery to the base, Grain glabrous, adherent to the palea.—Species few, of the temperate Old World.

The Italian Rye-grass. L. multiflorum, Lamk. (italicum, A. Br.) is a cultivated form of L. perenne.

1. L. temulentum, Linn. Sp. Pl. 83; annual, leaves flat, spikelets oblong-cuneate 3-8-fld., empty gl. linear many-nerved equalling or exceeding the rest of the spikelet, flg. gls. elliptic acute or awned. Fl. Dan. t. 160; Host Gram. Austr. t. 26; Engl. Bot. t. 1124; Knapp Gram. Britt. 101; Reichb. Ic. Fl. Germ. t. 5; T. Nees Gen. Fl. Germ. Monocot. t. t. 78; Steud. Syn. Gram. 340; Kunth Enum. Pl. i. 437; Ledeb. Fl. Ross. iv. 345; Boiss. Fl. Orient. v. 681; Benth. Fl. Austral. vii. 667; Aitchis. Cat. Panjab. Pl. 171; Wall. Cat. n. 3790; Duthie Grass. N.W. Ind. 44, Fodd. Grass. N. Ind. 68. L. annuum, Lamk Fl. Fr. iii. 620. L. arvense, With. Arr. Brit. Pl. Ed. III. ii. 168. Craepalia temulenta, Schrank Baier Fl. i. 382.

The UPPER GANGETIC PLAIN, the PANJAB, SIND, and WESTERN HIMALAYA, alt. 4-6000 ft.—DISTRIB. Europe, N. Asia (introd. elsewhere).

Stem 6-18 in., erect, usually stout. Leaves \(\frac{1}{2}\) in. broad, and sheaths smooth or scaberulous; ligule very short. Spike 6-10 in., strict, rachis stout. Spikelete very variable in size and shape, longer or shorter than the internodes; gl. I \(\frac{1}{2}\)-\frac{2}{3}\) in., rigid, erect; fl. gls. \(\frac{1}{2}\)-\(\frac{1}{2}\) in., awn \(\frac{1}{2}\) in. or shorter, or 0.

Var. speciosum, Griseb. in Ledeb. l.c.; spike very stout, gl. I large, fig. gls. short turgid obtuse. L. speciosum, Stev. ex Bieb. Fl. Tour. Cauc. i. 80. L. robustum,

Reichb. Ic. Fl. Germ. xi. II. t. 4.-Western Himalaya (introd.?).

2. Is. rigidum, Gaud., var. Duthiei, Hack. mss.; annual, stem and spike very slender strict erect, leaves short narrow, spikelets varrowly oblong closely appressed to the rachis 3-6-fid., empty gl. rather shorter than the rest of the spikelet oblong-lanceolate subacute 5-ribbed, fig. gls. elliptic subacute 5-nerved scaberulous above the middle narrowed at the hyaline apex into a slender terminal awn or awn infra-apical.

KASHMIB; near Signatur, alt. 5-6000 ft., Duthie (no. 10,846).—DISTRIB. of L.

rigidum, westward to the Caucasus and S. Europe.

I adopt Hackel's determination of this grass, which differs from L. rigidum proper in the narrower spikelets closely appressed to the rachis of the spike, and in the awned gluines, a character to which there is no approach in any of the numerous

specimens of L. rigidum which I have examined. The awns are as long as the gls. or lorger.

3. Z. perenne, Linn. Sp. Pl. 83; perennial, leaves linear complicate in vernation, spikelets oblong 3-11-fld., empty gl. 3-5-ribbed, shorter than the rest of the spikelet, fl. gls. oblong-lance-clate obtuse or sub-acute 5-nerved awned or not. Fl. Dan. t. 747; Host Gram. Austr. i. t. 25; Engl. Bot. t. 315; Knapp Gram. Britt. t. 180; Reichb. Ic. Fl. Germ. t. 8; T. Nees Gen. Fl. Germ. Monoc. i. n. 78; Kunth Enum. Pl. i. 436, Suppl. 358, t. 33, f. 1; Ledeb. Fl. Ross. iv. 343; Boiss. Fl. Orient. v. 679; Duthie Grass. N.W. Ind. 44, Fodd. Grass. N. Ind. 68. L. vulgare, Host l. c. t. 25.

WESTERN TIBET, alt. 15,000 ft., Stolizka (Duthie); Sikkim Himalaya, alt. 7000 ft., Clarke (introduced).—DISTRIB. Europe, N. Asia.

Probably not indigenous in India, though likely to occur in temperate regions. Its perennial character and stoloniferous habit at once distinguish it.

126. LEPTURUS, Br.

Small slender grasses. Leaves flat or convolute. Spikelets 1-2-fld., sessile, solitary, \(\frac{1}{2} \) immersed in hollows of the rachis of a simple terminal articulate or not straight or incurved spike, with the back of the lowest fl. gl. opposite the rachis; rachilla jointed. Glumes 3 or 4, I minute or 0; II longer than the fig. gls., linear, rigid, acute, 5-nerved, erect or at length deflexed; III and IV much shorter than II, hyaline; palea 2-keeled. Lodicules 2, cuneate or lobed. Stamens 1-3. Ovary glabrous; styles short, distant. Grain narrow or oblong, glabrous, free.—Species 6, natives of the Old World.

1. L. repens, Br. Prodr. 207; perennial, creeping, spikes shortly peduncled fragile, gl. I 0, II acuminate or sub-aristate many-nerved much longer than the fig. gls. Brongn. in Duperr. Voy. Bot. 57, t. 16; Kunth Enum. Pl. i. 463, Suppl. 374; Steud. Syn. Gram. 357; Trim. Cat. Ceyl. Pl. 110; Benth Fl. Austral. vii. 668. L. aciculatus, Steud. l. c.; Mig. Fl. Ind. Bat. iii. 403. Rottboellia repens, Forst. Prodr. 9. Monerma repens, Beauv. Agrost. 117. Lolium coelorachis, Forst. in Herb. Paris, Steud. Nom. Ed. 11. ii. 64.

CEYLON; near Colombo, Trimen.—DISTRIB. Malay and Pacific Islds., Australia. Stem elongate, woody branched and widely creeping below. Leaves 3-6 by \$\frac{1}{2}\$-\$\frac{1}{2}\$ in., spreading or erect, acuminate, glaucous; sheaths glabrous or mouth ciliate; ligule inconspicuous. Spikes 2-6 in., strict, erect; rachis glabrous. Spikelets 2-fld., rachilla elongate bearing an upper imperfect fl.; empty gls. 1 (or 2 in the uppermost spikelet) flat, rigid, \$\frac{1}{2}\$ in. long, closely appressed to the rachis; flg. gls. much shorter than the empty, elliptic, concave, 3-nerved; palea 2-keeled. Lodicules fleshy, obliquely truncate or 2-lobed, glabrous. Grain oblong.

2. L. Roxburghianus, Steud. Syn. Gram. 357; annual, erect, spikes long-peduncled very slender inarticulate, gl. I minute ovate, II linear-oblong acute rather shorter than the fig. gls. Rotthoellia biflora, Roxb. Fl. Ind. i. 357 (non Roth.); Kunth Enum. Pl. i. 467. R.? Roxburghiana, Schult. Mant. ii. 430.

DECCAN PENINSULA, Rozburgh. EASTERN PANJAB, dry hills in Hissar, Herb. Duthie.

Whole plant 8 in: high, densely tufted. Leaves 3-1 in., filiform or setuceous,

flexuous, flattened, margins ciliate with long strict hairs; sheath very short; ligule minute, 2-auricled. Scikes 2-3 in., as long as the filiform pedicels and hardly stouter, strict, erect. Spikelets $\frac{1}{10} - \frac{1}{2}$ in. 2-fid., both fi. bisexual (always?); gl. I sunk in the hollow of the rachis, obliquely ovate, 1-nerved, hyaline; II linear-oblong, acute, coriaceous, dorsally smooth, convex with a broad undefined midrib; III hyaline, distinctly 3-nerved, oblong, truncate, callus penicillate; palea hyaline, keels smooth; IV narrower than III; rachilla slender, penicillate. Lodicules minute. Anthers very short; filaments long. Ovary short; styles short, bases remote, divergent.—There is in Roxburgh's unedited Icones an excellent drawing of a small state of this plant, of which I have no specimen but Mr. Duthie's; it is no doubt overlooked from its small size and habit.

127. OROPETIUM, Trin.

A very small densely tufted erect annual. Leaves filiform. Spikelets very minute, 1-fld., half immersed in the alternating distichous cavities of the rachis of a simple slender curved inarticulate spike; rachilla bearded. Glumes I and II empty, persistent, I very minute, hyaline; II linear-lanceolate, rigid, recurved in fruit, tip obtuse or emarginate; III shorter, broader, hyaline, obtuse or truncate, 1-nerved; palea narrow, keels smooth. Lodicules 0? Stamens 3. Styles short. Grain oblong, terete, free.

Nardus stricta, Linn., is, according to Stewart, "Panjab Plants," p. 257, a native of the Trans-Indus district, and at a considerable elevation in the Jhelum basin. This is no doubt an error. Boissier gives as its Eastern limit, the Caucasus.

O. Thomaeum, Trin. Fund. Agrost. 98, t. 3; Kunth Enum. Pl. i. 464, Suppl. 375; Miq. Fl. Ind. Bat. iii. 403; Thw. Enum. Pl. Zeyl. 363; Trim. Cat. Ceyl. Pl. 110; Wall. Cat. n. 8869; Wight Cat. n. 1727; Duthie Grass. N.W. Ind. 45, Fodd. Grass. N. Ind. 69. Rottboellia Thomæs, Koenig in Naturf. xxiii. (1783) 210; Willd. Sp. Pl. i. 464; Roxb. Pl. Corom. ii. 17, t. 133, Fl. Ind. i. 357; Dalz. & Gibs. Bomb. Fl. 300. R. pilosa, Willd. l. c. 465. Nardus Thomæs, Linn. f. Suppl. 105; Sm. in Trans. Linn. Soc. i. 116.

PLAINS OF INDIA; from the Panjab to Bengal, Burma, and southward in the

Western Peninsula. Ceylon, Gardner.

Whole plant 2-3 in. high, forming hard tufts, stems compressed. Leaves \(\frac{1}{2}\)-1 in., erect, margins ciliate with long strict hairs; sheath short, open; ligale lacerate, not auricled. Spikes 1-1\(\frac{1}{2}\) in., about \(\frac{1}{3}\) in. diam., solitary or fascicled on very short brunches, curved; rachis undulating, green, tetragonous, with a broad central nerve on the flat faces. Spikelets \(\frac{1}{2}\) in., closely appressed to the rachis in the hollow of which the minute gl. I is sunk; gl. II slightly convex with a broad thickened centre; III semicircular in profile, excessively membranous, keel most minutely scabrid.

128. TRITICUM, Linn.

Annual or biennial grasses. Leaves flat. Spikelets few-fld, tumid, sessile, distichously spicate, solitary, with their sides opposite cavities in the articulate or inarticulate rachis; upper fl. male or neuter. Glumes rigid, often unequal-sided, I and II empty, obtuse or shortly awned, fewnerved, persistent; flg. gls. oblong or ventricose, dorsally rounded or keeled above, awnless or 1-3-awned, 5-9-nerved, lateral nerves not conniving with the central; keels of palea ciliate. Lodicules entire, ciliate. Stamens 3. Styles very short. Grain grooved ventrally, often hairy, free or adherent to the palea.—Species about 10, Oriental and Eastern Asiatic.

Sect. I. TRITICUM, proper. Glumes keeled.

T. VULGABE, Vill. Hist. Pl. Dauph. ii. 153; Host Gram. Austr. iii. 18, t. 26; Wall. Cat. n. 2334; Kunth Enum. Pl. i. 433, Suppl. 360, t. 34; T. Nees Gen. Fl. Germ. Monoc. i. t. 79; Aitchis. Cat. Panjab Pl. 171. T. sativum, DC. Fl. Fr. iii. 625; Lam. Encycl. ii. 554; Duthie Grass. N. W. Ind. 45, Fodd. Grass. N. Ind. 68.

Cultivated in many parts of Northern India and the DECCAN PENINSULA,

especially in the N.W., and up to 13,000 ft. in the HIMALAYA and TIBET.

It is beyond the scope of this work to detail the races of wheat cultivated in India, for which I must refer to Murray's article in Watts' "Dictionary of the Economic Products of India," and to Koernecke & Werner's "Handb. der Getreide Arten," ii. 209. All are believed to have been derived from T. monococcum, Linn., a native of the East from Greece to Mesopotamia. Hackel, the latest botanical writer on the wheats (in Engler & Prant. Planzenfam. ii. 80), regards all as referable to three species, monococcum, sativum, & polonicum, Linn. (the last is not cult. in India). According to Murray and others the following races are cultivated in India as elsewhere:—T. æstivum, Linn. Sp. Pl. 86; Roxb. Fl. Ind. i. 359; Grah. Cal. Bomb. Pl. 234; Datz. & Gibs. Bomb. Fl. Suppl. 97. T. anyleum, Ser. Mel. Bot. i. 124. T. compactum, Host Gram. Austr. iv. 4, t. 7. T. compositum, Linn. Sp. Pl. Ed. II. 126. T. dicoccum, Schrank. Fl. Baier, i. 389. T. durum, Draf. Fl. Atlant. i. 114; Stewart Panjab. Pl. 262. T. hybernum, Linn. Sp. Pl. 80, Roxb. l. c. T. Spelta, Linn. l. c.; Host l. c. iii. 31, t. 30. T. Zea, Host l. c. t. 29. T. turgidum, Linn. l.c.; Host. l. c. t. 28.

Dalz. & Gibs. have also, as cultivated in the Concan, a T. pilosum, Dalz. & Gibs. Bomb. Fl. Suppl. 97, the "Buckshee wheat" with tomentose spikelets. I have seen no specimens of it.

Sect. II. ÆGILOPS. Glumes dorsally rounded, not keeled.

T. Egilops, Beauv. Agrost. 180; annual, leaves linear flat, spike elongate cylindric fragile, spikelets oblong turgid 3-5-fld. half sunk in hollows of the rachis, gl. I and II similar oblong-quadrate many-nerved, fl. gls. rather longer awnless or in the upper spikelets with one strict erect awn. Ægilops squarrosa, Linn. Sp. Pl. 1051; Tausch. in Flora, xxxix. (1837) 108; Kunth Enum. Pl. i. 458, Suppl. 371; Jaub. & Spach. Ill. Pl. Or. iv. 12, t. 310; Schreb. Gram. ii. t. 27, f. 2; Cav. Ic. t. 90; Ledeb. Fl. Ross. iv. 326; Boiss. Fl. Orient. v. 676. Æ. cylindrica, C. A. Mey. Verz. Pl. Cauc. 26 (non Linn). Æ. Tauschii, Coss. Notes Crit. 69.

N.W. India, Falconer; Wazuristan, alt. 4500 ft., Stewart.-Distrib. Westward

to Spain and N. Africa.

Stem 6-18 in., erect or geniculately ascending, stiff, leafy. Leaves acuminate, smooth or slightly scubrid; sheaths smooth, upper subventricese; ligule very short. Spike 1\frac{1}{2}-\frac{5}{2}\) in., strict; rechis stout. Spikelets \frac{1}{2}-\frac{1}{4}\) in., alternating in close succession; gl. I and II coriaceous, tip truncate often crenulate; flg. gls. hardly longer, truncate or retuse; awns \frac{1}{2}-1\frac{1}{2}\) in.

DOUBTFUL SPECIES.

T. BENGHALENSE, Host ex Steud. Nom. Ed. II. ii. 715.

ÆGILOPS CILIABIS, Koen. ex Roem. et Sch. Syst. ii. 772 (genus Manisuro proximus) = Rottboellia ciliaris, Willd. ex Steud. l. c. 474 (Ischæmi sp., Trin.).

ÆG. COBDATA, Linn., Aitch. Cat. Panjab. Pl. 560.

129. AGROPYRON, J. Gærtn.

Annual or perennial grasses. Leaves flat or convolute. Spikelets 3-many-fld., solitary, sessile, distichously arranged opposite to hollows in the rachis of a simple spike, with the sides of the glumes opposite the rachis;

rachilla usually jointed between the fl. gls. Gl. I and II empty, opposite, (not collateral) narrow, unequal, persistent; fl. gls. rigid, awned or not; nerves 5-7, converging above; keels of palea ciliate. Lodicules entire or ciliate. Stamens 3. Ovary hispid at the top, styles short, distant. Grain narrow, grooved in front, adherent to the palea or not.—Species about 20. in all temp. climates.

The following arrangement and nomenclature of the Indian plants of this most puzzling genus is tentative only, and I cannot render these more worthy of confidence without undertaking a critical study of the whole genus. The characters given under the species must not be regarded as absolute, though founded on careful study of very large series of specimens; for the more of these that are studied; especially if they come from different localities, the more do exceptional characters and connecting forms present themselves. It would hence appear that all the members of the section Eu-agropyrum (perennials with dorsally convex not keeled fl. gls. to which all the Himalayan forms belong) will resolve themselves into a very few widely distributed species. A further difficulty is the distinguishing Agropyrum from Elymus, and indeed E. sibiricus from A. longe-aristatum, in which two plants the empty glumes are not placed side by side as in Elymus proper; added to which the spikelets are often solitary in E. sibiricus, and I think sometimes aggregated in A. longe-aristatum, var. Aitchisoni. A. caninum, Roem. & Sch.; Duthie Grass. N.W. Ind. 44, has according to Duthie's mss. been found at Simla, alt. 6500 ft., by Gamble; and by himself in Gaugotri, alt. 10-11,000 ft. I have seen no specimens.

* Spikelets awned.

1. A. longe-aristatum, Boiss. Fl. Orient. i. 660; stems leafy, leaves flat or convolute, spikelets loosely imbricate flattened laterally 6-12 fld., I and II long or short 3-5-nerved, flg. gls. spreading linear-lanceolate 3-5-nerved towards the tip narrowed into a long usually recurved awn 1-11 in. long. Brachypodium longearistatum, Boiss. Diagn. Ser. 1. vii. 127. Griseb. in Goett. Nachr. (1868) 73. Triticum longearistatum, Janb. & Sp. Ill. Pl. Orient. ii. t. 199; Steud. Syn. Gram. 346. T. elymoides, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 440; Steud. l. c.

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 5500-13,000 ft. EASTERN and WESTERN TIBET, alt. 12-17,000 ft.-Distrib. Affghan, Persia, Abyssinia.

Stem 1-3 ft., stout or slender, erect or ascending from a tufted base. Leaves 6-10 by 1-1 in., rarely convolute, and sheaths smooth; ligule very short. Spikes 3-5 in., erect or nodding, or horizontal from the decurved top of a very slender peduncle, rarely ovoid and very dense-fid.; rachis slender, smooth; margins of hollows scaberulous or ciliolate. Spikelets sessile, remote or approximate, sometimes crowded and secund, 1-2 in. long without the awns, green or blue-purple. Gl. I and II most variable in length, 1-1 the length of the lowest fl. gl., elliptic-ovate to narrowly setaceous, awned or not, tip sometimes notched on one side; fig. gls. narrowly lanceolate, smooth or scabrid, narrowed into a usually straight but sometimes recurved stout or slender scabrid awn, prominently 5-nerved above the middle rarely to the base, tip sometimes toothed unilaterally or on both sides of the awn; palea corinceous, keels ciliolate with erect teeth above the middle. Lodicules hyaline, ciliate. Anthers short. Grain oblong, compressed.—Except by the long awas I um at a loss how to diagnose this variable grass, some states of which approach Elymus sibiricus so closely that I can hardly distinguish them. The following varieties are represented amongst Persian specimens. I do not find that they affect definite localities or elevations in the Himalaya.

1. (il. I and II very short oblong-lauceolate acute or acuminate usually strongly 3-nerved, fl. gls. glabrous or nearly so except towards the tip.

2. Gl. I and II as in 1, fl. gl. scabrid more or less throughout.

3. Gl. I and II long setaceously lanceolate or lanceolate and long-awned, fl. gls. smooth or scabrid towards the tip.

4. Gl. I and II as in 3, fl. gls. scabrid more or less throughout.

2. A. semicostatum, Nees ex Steud. Syn. Gram. 346; tall, slender, leaves flat, spike elongate, spikelets distant 7-8-fld., gl. I and II linear-lanceolate acuminate smooth or scaberulous strongly 5-7-nerved, flg. rather longer erect lanceolate scaberulous above tip entire or 1-2-toothed and narrowed into a straight rarely recurved slender awn twice as long as itself or shorter. Boiss. Fl. Orient. y. 662; Duthie Grass. N.W. Ind. 45.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 6-11,000 ft. (as low as 8000 ft. in the Sutlej valley), Thomson, Royle, Jacquemont, &c.—DISTRIE. Affghan. Turkestan.

Stems 2-3 ft., tufted, erect, or longer, and up to 8 ft., then weak and inclined. Leaves narrow, rarely \(\frac{1}{2}\) in. broad, acuminate, scaberulous or smooth; sheaths smooth; ligule very short. Spikes 3-8 in., rachis scabrid, slender or rather stout. Spikels 1-2 in. including the awns, green; internodes of rachilla short; gls. scabrid as is the callus of the fl. gl.; empty gls. always large but very variable in size and nerves, \(\frac{1}{2}\) in. long; flg. gls. erect and appressed, not at all spreading, tip toothed on one or both sides; awn rarely 1 in. long.—As suggested by Boissier this is very closely allied to \(A.\) caninum. In a specimen from Kashmir (\(Duthic, No. 12,651\)) named semicostatum by Hackel, the awns are upwards of an inch long and reflexed as in longe-aristatum, to which it may be referable.

Var. Thomsoni, Hook. f.; leaves hairy, sheaths villous with reversed hairs .-

Kunawur, alt. 11-12,000 ft., Thomson.

3. A. striatum, Nees ex Steud. Syn. Gram. 346; tall, robust, leaves flat or involute, spikelets many large imbricating, gls. I and II linear-oblong or oblong-lanceolate as long as gl. III acute or obtuse very strongly 7-many-nerved, fig. gls. ovate-lanceolate 5-nerved puberulous or glabrous margins usually ciliate, tip notched or entire, awn straight longer or shorter than the gl. Triticum striatum, Steud. l. c.

KASHMIR, alt. 8-12,000 ft., Royle, Jacquemont, &c.

Stem 2-4 ft., as thick as a goose's or swau's quill, or more slender. Leaves $\frac{1}{4}$ - $\frac{3}{3}$ in. broad, scaberulous above. Spike 3-8 in., rachis stout, glabrous with ciliolate margins of the hollows or puberulous. Spikelets $\frac{1}{2}$ -1 in. long, glumes not spreading; I and II subequal, very coriaceous, II $\frac{1}{2}$ - $\frac{3}{2}$ in. long, deeply channelled when dry; tip sometimes notched or obliquely truncate.—Probably a gigantic form of A. semicostatum or caninum.

4. A. Jacquemontii, Hook. f.; dwarf, leaves filiform flexuous, sheaths hyaline silvery, spikelets 2-5 cuneately obovate, glumes spreading, I and II small lanceolate acuminate, II 3-nerved awned, fl. gls. lanceolate smooth 5-nerved above the middle narrowed into a slender recurved awn many times longer than itself. Bromus tataricus, Jacquem. mss.

WESTERN TIBET; Bekar, Jacquemont; Nubra, alt. 17,000 ft., Thomson; plain N. of Kumaon, alt, 15,500 ft., Strachey & Winterbottom; Chimoreri, Stoliczka.

Stems 6-12 in., erect or ascending, densely tufted, thickened at the base and clothed with short shining sheaths. Leaves 1-3 in., convolute, glabrous, tip obtuse. Spikelets subterminal, close together, \(\frac{1}{2}\)-\frac{1}{2} in. long without the awns, 4-6-fld.; rachilla smooth; gls. I and II \(\frac{1}{2}\)-\frac{1}{2} in., margius hyaline, nerves very prominent; flg. with the outer pair of nerves mavginal and produced to the base, the inner pair rarely reaching below the middle, tip sometimes 2-toothed; awn sometimes strongly recurved, rarely straight; palea obtuse, keels ciliolate. Anthers very small.—I

should have taken Jacquemont's mss. specific name for this species, had it not been that it was taken up by Munro for another plant. (See Elymus sibiricus.)

5. A. Thomsoni, Hook. f.; lower sheaths villous, spikelets many ovoid erect, glumes erecto-patent, I and II ovate-oblong acute or acuminate 5-7-nerved margins hyaline, fig. gls. silkily villous ovate-lanceolate narrowed into an erect slender awn twice as long as the gl. or shorter.

WESTERN HIMALAYA, alt. 10-12,000 ft., from Kunawur and Piti, Jacquemont,

Thomson, to Garwhal, Strackey & Winterbottom, Duthie.

- Stem 2-3 ft., stout or slender, densely tufted. Leaves narrow, margins flat or involute, upper glabrous, lower more or less hairy. Spikes 3-6 in., rachis pubescent on the margins or all over. Spikelets 1-3 in. without the awns, 5-7-fld.; internodes of rachilla short, scaberulous; gls. I and II with scaberulous nerves; II sometimes toothed at the tip and mucronate; flg. gls. faintly nerved; keels of palea ciliate.
 - ** Spikelets awniess (or very shortly awned in Indian specimens).
- 6. A. repens, Beauv. Agrost. 102 (the Indian form); stem very slender, leaves narrow, spike slender, spikelets rather distant 5-6-fid. oblong quite glabrous, gls. I and II unequal linear or linear oblong obtuse acute or notched at the tip strongly 3-5-nerved margins scarious, II much shorter than III, flg. gls. linear obtuse or obliquely retuse or notched strongly 3-5-nerved in the upper half. Reichb. Ic. Fl. Germ. i. t. 20; T. Nees Ic. Fl. Germ. Monocot. i. n. 80; Steud. Syn. Gram. 343; Ledeb. Fl. Ross. iv. 341; ?Boiss. Fl. Orient. v. 663. A. acutum, Roem. & Sch. Syst. ii. 751; Reichb. l. c. t. 22. Triticum repens, Linn. Sp. Pl. 86; Fl. Dan. t. 748; Host Gram. Austr. ü. 27, t. 21; Engl. Bot. t. 909; Knapp Gram. Britt. t. 111; Kunth Enum. Pl. i. 440, Suppl. 361.

KASHMIB, alt. 9-12,000 ft., Duthie. WESTERN TIBET; Gilgit, alt. 8:00 ft.,

Giles; Ladak. Zanskar and Karakoram, alt. 8-14,000 ft., Thomson, &c.

- Stems 1-2 ft., densely tufted at the base, erect or ascending. Leaves flat, or convolute when dry, \(\frac{1}{2} \frac{1}{2} \) in. broad, smooth, glabrous or puberulous above. Spikes 3-6 in., erect, rachis slender, margins of hollows quite glabrous. Spikelets \(\frac{1}{2} \frac{1}{2} \) in. very pale, internodes of rachilla short nearly glabrous; glumes rather spreading, calli quite glabrous; keels of palea smooth.—I follow Munro, Clarke and Hackel (in litt.) in referring this species to A. repens, though it differs much from Boissier's description of that species in the leaves not being scabrid, in the unequal glumes, of which I and II are much shorter than the fig. and in the latter not being lanceolute.
- 7. A. dentatum, Hook. f.; root creeping, leaves flat, spike slender, spikelets imbricating 3-5-fld. quite glabrous or sparsely pubescent, gls. I and II large subequal oblong obtuse obliquely truncate unidentate or mucronate rarely awned very strongly 7-9-nerved, fl. gls. linear-oblong obtuse acute or acuminate strongly 5-nerved above the middle.

KASHMIE, alt. 9-12,000 ft., Jacquemont, Thomson, &c. WESTERN TIBET,

Karakoram, alt. 14,000 ft., Clarke.

Habit of A. repens, to which specimens have been referred by Munro and Clarke, but the spikelets (which are green or purplish) are closely imbricating, the margins of the hollows of the rachis scaberulous or ciliclate, the empty gl. much larger broader and as long as the fig. or nearly so and many-neved.—Under No. 12,432 of Duthie's Kashmir collections I find along with typical A. destatum, and

apparently from the same plant, a specimen with scaberulous leaves and sheaths, ovate-lanceolate acuminate shortly awned 3-5-nerved empty gls. and fewer

pubescent acuminate shortly awned fig. gls.

Var. ?elatum, Hook. f.; stem 3-4 ft. stout, leaves \(\frac{1}{2} \) in. broad, empty gl. \(\frac{1}{2} - \frac{1}{2} \) in. long ovate-lanceolate acuminate shortly awned entire or notched on one side 5-7-nerved, fl. gls. narrowed into a short awn.—Kashmir; Dras, alt. 12-13,000 ft., Thomson.—Perhaps this had better be referred to semicostatum or striatum. It was placed in repens by Munro.

130. HORDEUM, Linn.

Erect annual, rarely perennial grasses. Leaves flat. Spikelets 1-fld., 2-3-nate in the hollows or at the nodes of a simple cylindric spike, the lateral often imperfect; rachilla jointed at the base of the fl. gl. and produced above it with sometimes an imperfect gl. Glumes I and II empty, very narrow, rigid, persistent, the outer of each cluster of spikelets often together resembling an involucre; III dorsally rounded, 5-nerved above, narrowed into an erect or recurved awn; palea 2-keeled. Lodicules 2, ciliate. Stamens 3. Styles very short. Grain grooved in front, tip usually villous, adherent to the palea or free.—Species about 12, natives of temperate regions.

* Annuals.

H. VULGARE, Linn. Sp. Pl. 84; spikelets 2-6-ranked, fl. gl. long-awned. Beauv. Agrost. 114, t. 21, f. 1; Host Gram. Austr. iii. 23, t. 34; T. Nees Gen. Fl. Germ. Monocot. i. n. 83; Steud. Syn. Gram. 357; Duthis Grass. N. V. Ind. 45, Fodd. Grass. N. Ind. 69, t. F. f. 32; Nees Agrost. Bras. 455; Wull. Cat. n. 3789; Hack. in Engl. & Prantl Pflanzenfam. ii. 80; Koern. & Wern. Handb. der Getreideb. ii. 600. H. sativum, Pers. Syn. i. 108. H. coeleste, Viborg; Wight Cat. n. 1772.

Cultivated, chiefly in N. INDIA and up to 13,000 ft. in the Himalaya.

Var. hexastichon, Aitchis. Cat. Panjab. Pl. 171; spikelets 6-ranked, H. hexastichon Linn. Sp. Pl. 85; Beauv. l. c. 114 (hexastachyon); Kunth l. c. 455, Suppl. 368; Host l. c. iii. 24, t. 35; Gærtn. Carp. ii. 10, t. 81, f. 3; Roxb. Fl. Ind. i. 358; Grah. Cat. Bomb. Pl. 234; Dalz. & Gibs. Bomb. Fl. Suppl. 96; Nees Agrost. Bras. 455; Steud. l. c.

Var. distichon; spikelets 2-ranked. H. distichon, Linn. l. c. 85; Host l. c. 35, t. 36; Kunth l. c. i. 455, Suppl. 369, t. 37; Gærtn. Carp. ii. 10, t. 81, f. 3; Ledeb. Fl. Ross. iv. 327; Nees Agrost. Bras. 454; Steud. l. c. 351. Zeocriton disticum,

Beuuv. Agrost. 115 .- Quetta, Stocks (cult.).

Vsr. Ægiceras, Aitchis. Cat. Panjab Pl. 171; spikelets 2-ranked, gl. III produced into a dilated 3-fid appendage with the lateral lobes deflexed. H. Acgiceris, Royle Ill. Bot. Himal. 418, t. 97; Henslow in Hook. Kew Journ. i. (1849) t. 2, 3; Schlecht. in Bot. Zeit. (1847) 768; Lindl. Nat. Syst. Bot. Ed. II. 372. H. coeleste rar. trifurcatum, Hort. Monsp.; Schlecht. in Linnaa, xi. (1837) 543; Sir. in Ann. Sc. Phys. & Nat. Soc. Agric. Lyon. iv. ex Bot. Zeit. (1847) 768. H. heterostachyum, Beauv. Agrost. 114. H. himslayense, var. trifurcatum, Hort. Monsp.; ex Irmisch in Linnaa, xiii. (1839) 124, t. 4; Steud. l. c. 252. H. nepalense, Sweet Hort. Brit. Ed. I. 444. H. trifurcatum, Fisch. & Mey. Ind. Sem. Hort. Petrop. fusc. 3 (1837) 131; Wender. in Flora (1843) 233. H. vulgare, var. cornutum, Schrad. in Linnaa, xii. (1838) 471. H. vulgare, var. trifurcatum, Koern. & Wern. l. c. i. 170, t. 3, f. 26. Critho Aegiceras, E. Mey. Ind. Sem. Hort. Regiom. 1848, 5; in Ann. Sc. Nat. Ser. III. xi (1849) 253; Linnaa, xiiv. (1851) 195. Triticum l.ordeiforme, Wall. ex Steud. Nomencl. Ed. II. ij. 716.—Thibet Barley, Hook. Lond. Journ.

Bot. vii. (1843) 215.—Temp. and Alp. Himalaya, from Kashmir to Sikkim, Tibet and China.

Var. nudum; spikelets 2-ranked, grain free within the pales. H. nudum, Arduini in Schult. Mant. ii. 437. H. gymnodistichum, Watt Diet. Econ. Prod. Ind. iv. 274. H. distichum, β. Kunth l. c. i. 455; Kew Bullet. (1888) 271. H. cocleste, Korn. et Wern. l. c. i. 166, ii. 629. PH. himsluyense, Rittig Beschr. Himal. Gerste (1822), ex Schult. Mant. ii. 481.—Cult. up to 14,000 ft. with brown or often purplish spikes.

1. **H. spontaneum**, C. Koch in Linnæa, xxi. (1848) 430; tall, densely tufted, leaves flat finely acuminate, spike narrow rachis fragile, spikelets 2-ranked lateral stipitate male awnless, fig. gl. lanceolate plumosely ciliate, awn very long flattened. Steud. Syn. Gram. 351. H. ithaburense, Boiss. Diagn. Ser. I. xiii. 20; Fl. Orient. v. 687; Aitchis. in Trans. Linn. Soc. Ser. 11. iii. 127. H. Decaisueanum, Hort.

BRITISH BELUCHISTAN; Quetta, Stocks,-DISTRIB. Westwd. to Palestine.

Stems forming great clumps 3 ft. high, resembling cultivated barley, Aitchis. l. c. Leaves flaccid, narrowed into very long points; ligule short. Spikes 1½-3 in. Spikeslets ½ in., pedicel flat with villous margins; gls. linear-oblong. Awn 4-8 in.—The only truly wild Barley of the cultivated type, most nearly allied to vulgare var. distiction, but differing in the villous spikelets and jointed fragile spike. Grisebach, however (in Ledeb. Fl. Ross. iv. 317) says under the cultivated H. distiction, that he has found the spike to be fragile in some of its forms.

2. H. murinum, Linn. Sp. Pl. 85; stems ascending leafy, spike stout subcylindric fragile dense-fld., spikelets 3-nate lateral male or neuter, fl. gl. lanceolate awned ciliate below or glabrous. Fl. Dan. t. 629; Host Gram. Austr. i. 25, t. 32; Engl. Bot. t. 1971; Knapp Gram. Britt. 104; Reichb. Ic. Fl. Germ. t. xi.; T. Nees Gen. Fl. Germ. Monocot. i. n. 83; Kunth Enum. Pl. i. 456, Suppl. 370; Ledeb. Fl. Ross. iv. 328; Boiss. Fl. Orient. v. 686; Benth. Fl. Austral. vii. 669; Nees Agrost. Bras. 453, Fl. Afr. Austral. 363; Sleud. Syn. Gram. 352; Duthie Grass. N.W. Ind. 45. H. leporinum; Link in Linnæa, iv. (1835) 133. H. vaginatum, C. Koch in Linnæa xxi. (1848) 433; Steud. l. c. Triticum murale, Salisb. Prodr. 27. Zeocriton murinum, Beauv. Agrost. 125.

KASHMIE; alt. 5-6000 ft., Jacquemont, &c. Peshawue, Stewart.—DISTRIB. Westwd. to the Atlantic.

Stem 6-18 in., ascending from an often decumbent base. Leaves flat, glabrous or sparsely puberulous and scaberulous; sheaths inflated; liquid small, scarious. Spikes 1-2½ by $\frac{1}{2}-\frac{2}{3}$ in., inclined, green. Spikelets with the awns 1 in.; empty gl. filiform; fig. gl. flattened, much shorter than the straight awn; keels of palea ciliate.

** Perennials.

3. H. secalinum, Schreb. Spicil. Fl. Lips. 148; stem erect leafy, spike narrow subcylindric dense-fld., epikelets 3-nate lateral male or neuter. Host Gram. Austr. i. 26, t. 33; Trin. Sp. Gram. Ic. t. 3 & 4; Benth. Fl. Austral. vii. 669; Boiss. Fl. Orient. v. 687. H. pratense, Huds. Fl. Angl. Ed. II. 56; Engl. Bot. t. 409; Trin. l.c. t. 4; Knapp Gram. Britt. t. 105; Reichb. Ic. Fl. Germ. i. t. xi.; Ledeb. Fl. Ross. v. 328; Steud. Syn. Gram. 352; Duthie Grass. N.W. Ind. 45. H. nodosum, Linn. Sp. Pl. Ed. II. 126 (excl. Syn. Ray.). H. brevisubulatum, Link in Linnea, xvii. (1843) 391. H. maritimum, Roth Tent. Fl. Germ. II. i. 150; Fl. Dan. t. 630. Zeocriton secalinum, Beauv. Agrost. 115.

KASHMIB & ISKARDO, alt. 7700 ft., Clarke, Duthie. WESTERN TIBET, alt. 10-15,000 ft., Thomson. Shibchilam (N. of Kumaon) alt. 15,000 ft., Strackey & Winterbottom.—DISTRIB. Europe, N. Asia, temp. N. & S. America.

Stems densely tufted, 3-6 in., stout or slender, often geniculate at the base. Leaves short, linear, flat, glabrous or hairy beneath; ligule small. Spikes 2-3½ by ½-½ in., erect or inclined; rachis subfragile, green or purplish. Spikelets densely crowded, sub hexastichous, ½-½ in. long, awns longer or shorter than the gl.—Some of Dr. Thomson's Tibetan specimens are upwards of 3 ft. high with the stem nearly as thick as a goose-quill.

131. ELYMUS, Linn.

Characters of Agropyrum, but spikelets for the most part in pairs, threes, or fascicled in the nodes of the rachis, and empty gls. usually more or less collateral—Species about 20 enumerated, of N. and S. temperate regions.

Boissier (Fl. Or. v. 690) considers Elymus as too closely allied to Hordeum. To me it appears to be connected with Agropyrum through E. sibiricus, and A. longe-aristatum, in both which the empty glunes are opposite one another, not as in the other Indian Elymi placed more or less collaterally. It is as difficult to limit the species in one genus as in the other, and the more specimens one has of any species, the more difficult is is to limit it.

* Awn of fl. gl. much longer than the gl.

1. E. sibiricus, Linn. Sp. Pl. 3; spike short or elongate and flexuous, spikelets geminate and fascicled, empty gls. subopposite much shorter than the 5-7-fld. spikelet, fl. gls. lanceolate 5-nerved narrowed into a slender erect or recurved awn much longer than the gl. Schreb. Gram. i. t. 21, f. 1; Kunth Enum. Pl. i. 451, Suppl. 367; Ledcb. Fl. Ross. iv. 330; Steud. Syn. Gram. 348; Duthie Grass. N.W. Ind. 46. E. glaucus, Burkl. in Proc. Acad. Sc. Philad. 1862, 99. E. nutans, Griseb. in Goett. Nachr. (1868) 72. E. tener, Linn. f. Suppl. 114.

TEMPERATE & ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 10-14,000 ft. EASTEHN & WESTERN TIBET, alt. 10-15,000 ft. (15-18,000 ft., Stoliczka).—DISTRIB. Affirhan.. Abyssinia, N. Asia & America.

Stem 1-2 ft., densely tufted, ascending, smooth, erect inclined or decurved below the spike. Leaves 1-1 in. broad, nearly smooth; ligule very short. Spike very variable, 4-10 in. long, green or brownish, straight curved or flexuous; rachis smooth, or faintly scabrid, as are the margins of its hollows. Spikelets 1-1 in. long excluding the awns, sessile and pedicelled; rachilla slender, minutely scaberulous, its internodes long or short; gl. I and II most variable, II 1-3 the length of the lowest fl. gl., from narrowly oblong to ovate-oblong lanceolate or almost setaceous, acute acuminate or both or II only awned, quite entire (never notched), usually strongly 3-nerved; fl. gls. narrowly lanceolate, narrowed into the awn, quite entire or tip toothed on one or both sides at the base of the awn, glabrous smooth or faintly scaberulous, 5-nerved usually to the base; awn 3-1 in.; palea linear, keels ciliate-toothed above the middle. Lodicules lucerate. Anthers short. Ovary pyriform, top hirsute; stigmas short .- A very abundant grass in Tibet and the higher Himalaya, states of which are with difficulty distinguished from Agropurum longe-aristatum (which see), and just as variable, in the empty glumes especially, but the awns are usually shorter. A small very slender form with an inclined horizontal and upcurved spike of secund purplish spikelets is var. minor of Hackel (Duthie n. 13,745) and Agropyrum longe-aristatum var. Aitchisoni of Boiss. (Fl. Or. v. 660) and Brachypodium tataricum, Munro in Journ. Linn. Soc. xviii. (1881) 109 .-Another variety (Bromus dubius, Jacquem. mss.) has oblong very dense short subcylindric spikes. It is a very alpine form, found at 15-18,000 ft. elevation in Eastern and Western Tibet.

2. E. dahuricus, Turc. in Bull. Soc. Nat. Mosc. (1838) 105, et xxix. I. (1867) 62; spike narrow strict or subflexuous, spikelets geminate 2-3-fld., empty gls. collateral linear-lanceolate acuminate or subaristate 5-7-nerved nearly as long as the spikelet, fl. gls. lanceolate scaberulous 5-nerved narrowed into a slender erect awn as long or twice as long as the gl. PHordeum sylvaticum, Duthie Grass. N.W. Ind. 45.

KASHMIR, Falconer, &c.; Iskardo, Clarke, alt. 7500 ft.; Sind Valley, 6000 ft., Gammie. Western Tibet, alt. 11-14,000 ft., Thomson-Distrib. N. Asia.

Stem 2-3 ft., rather stout and leafy, or shorter more slender and leafy at the base chiefly. Leaves 3-8 by $\frac{1}{6}-\frac{1}{6}$ in., flat, finely acuminate, nearly smooth or scaberulous above; sheaths smooth; ligule very short. Spike 3-8 in.; rachis glabrous or nodes pubcscent. Spikelets $\frac{1}{6}-\frac{1}{6}$ in. exclusive of the awns, green, imbricating; gl. I and II subequal, strongly 3-5-nerved, smooth or scaberulous, rarely toothed on one side towards the tip; fl. gls. lanceolate, more or less distinctly notched at the tip, 5-nerved, from nearly glabrous to scaberulous, and with minutely ciliolate nerves; awn $\frac{1}{6}-\frac{1}{6}$ in.; keels of obtuse palea strongly shortly ciliate. Grain oblong, dorsally compressed, concavo-convex, tip villous.

Var. ? more robust, spike stouter, spikelets large, \(\frac{1}{2} - \frac{3}{4} \) in., more crowded, 3-5-fld.,

awns of fl. gl. 1-1 in.—Karakoram, alt. 12,000 ft., Clarke.

** Awn of fl. gl. much shorter than the gl. I.

3. E. dasystachys, Trin. in Ledeb. Fl. Alt. i. 120, Fl. Ross. iv. 333, Ic. t. 249; spike stout strict, spikelets geminate 2-5-fld., empty gls. collateral unequal subulate-lanceolate 1-3-nerved aristately acuminate, II nearly as long as the lowest fl. gl., fl. gls. lanceolate more or less silky 5-nerved tip notched towards the subulate or shortly awned tip. Steud. Syn. Gram. 350; Duthie Grass. N. W. Ind. 46. E. jenisseensis, Turc. in Bull. Soc. Nat. Mosc. xxix. (1856) i. 645

KASHMIR & KUNAWUR, alt. 8-12,000 ft., Jacquemont, Clarke, &c. WESTERN TIBET, alt. 10-14,000 ft., Thomson, &c. Luptal (N. of Kumaon) alt. 14,500 ft.,

Strachey & Winterbottom .- DISTRIB. Turkestan, Siberia.

Stem 2-5 ft., stout or slender. Leaves 6-12 in., flat and \(\frac{1}{6}\)-\frac{1}{2} in. broad, or narrow with margins involute, smooth or scaberulous. Spike 6-8 in., variable in breadth; rachis stout, pubescent sparsely villous or nearly glabrous. Spikelets \(\frac{1}{2}\) in. long; gl. I and II very narrow, 1- rarely 3-nerved; fl. gls. notched at the base of the awn on both sides, 5-nerved, rarely almost glabrous; keels of obtuse palea stoutly ciliate.

4. E.? Thomsoni, Hook. f.; spike stout strict, spikelets 2-3-nate densely crowded sessile and pedicelled, glumes all scarious (in frt.) broadly oblong or ovate-oblong with hyaline margins or very stout midrib and 7-9 fainter lateral nerves suddenly ending in a short stout awn.

WESTERN TIBET; Dauskar, in Piti, alt. 13,000 ft., Thomson.

Stem 12-14 in., very stout, erect. Leaves 3-6 in., narrow, convolute, coriaceous, smooth, finely acuminate, subpungent; sheaths broad, striate; ligule very short. Spike 3-4 in., rachis very stout, smooth or subsilky on the angles. Spikelets 1-1 in., glabrous or faintly pubescent; rachilla very short and stout; glumes subpubescent, usually broadly notched below the awn often unequally, margins ciliolate, 7-9-nerved; palea very broad, pubescent, ciliate, 2-lobed, keels unequal more or less ciliate. Grais free, concavo-convex, top glabrous.—I have seen only two specimens of this plant, which resembles a wheat more than an Elymus, from which latter genus it differs in the free grain with a glabrous tip; both specimens are far advanced, and I doubt the grain being in a normal condition.

131.1 ASPERELLA. Humb.

(Not in Clavis, p. 9.)

Tall perennial grasses. Leaves narrow, flat. Spikelets 1- or more-fld., 2-3-nate opposite hollows in the rachis of a terminal elongate simple slender spike, with the sides of the glumes opposite the rachis; rachilla jointed under the flg. gls. Glumes I and II 0, or in the lowest spikelets minute, subulate; flg. gls. rigid, lanceolate, convolute, narrowed into an awn, dorsally rounded, 5-nerved above the middle; palea 2-keeled. Lodicules 2, obovate or dimidiate-obovate, hairy. Styles very short, free, stigmas plumose. Grain narrowly oblong, ventrally grooved, adherent to the palea, tip villous.—Species 5, 1 Siberian, 2 American, 1 N. Zealand, and the following.

A. Duthiei, Stapf in Hook. Ic. Pl. ined. f.; spikelets 1-fld., rachilla produced.

WESTERN HIMALAYA; Tibri-Garwhal; alt. 7-8000 ft., Duthic.—DISTRIB. China.

Stem 3 ft., glabrous. Leaves 10 by \(\frac{3}{2}\) in. lanceolate, setaceously acuminate, thinly membranous, scabrid on both surfaces; sheaths elongate, nodes thinly villous; ligule truncate, minutely ciliolate. Spike 6 in., very slender, rachis pubescent. Spikelets \(\frac{1}{2} - \frac{3}{2}\) in. long, nearly all 2-nate, pale; rachilla glabrous terminated by an awn; fig. gl. lanceolate, 7-nerved, narrowed into an awn almost twice as long as itself, nerves rough; palea about as long as the gl. Lodicules obovate, hairy.—Allied to \(A\). Hystrix, Willd., and to \(A\). sibirica, Trautv. differing from both in the 1-fld. spikelets. Foliage as in \(A\). Hystrix, but spike not at all stiff. \(A\). sibirica has narrower firmer leaves, more markedly nerved gls.. and much shorter awns.—Stapf.

Tribe XI. BAMBUSEÆ. (See p. 91.)

By J. S. Gamble, M.A., F.L.S., Conservator of Forests, N.-W. Provs.

The following account of the Indian Bambusew is drawn up, almost verbatim. from Mr. Gamble's "Bamboos of British India," which forms part of vol. vii. of Dr. King's "Annals of the Royal Botanic Gardens of Calcutta," and of which Dr. King favoured me with a copy in advance, together with his and Mr. Gamble's permission to reproduce its contents in a form suited to the "Flora of British India." In doing this I have been obliged to curtail the descriptions. And in order to preserve the arrangement of matter adopted in this work, I have had to substitute for the Keys to the species employed by Mr. Gamble, specific characters selected according to my judgment from his detailed descriptions; and in a few cases to substitute synonymous technical terms for those he has used. I have added nothing: for it is obvious that a botanist of Mr. Gamble's ability and wide experience of so many of the Indian Bamboos in their native forests, having access also to the unrivalled collections in the Herbarium of the Calcutta Gardens, should have exhausted the subject in so far as materials were available. It must not be supposed that this work supersedes his "Bamboos of British India," which is indispensable to the student of the tribe, by reason of its fuller descriptions, and admirable plates and analyses. My cordial thanks are directly due to Dr. King and Mr. Gamble for this generous contribution to the "Flora of British India," and indirectly for the authentically named collection of specimens corresponding to Mr. Gamble's descriptions, which has been presented by the Government of India to the Herbarium of the Royal Gardens, Kew.

Since the above was written, Mr. Freeman Mitford's "The Bamboo Garden" has appeared, a work replete with valuable observations upon the habit, mode of growth, and other characters of the hardy species of Bamboo (including 5 Indian) cultivated by him. In it is pointed out (see Arandinaria Simoni, p. 60) for the

first time the true characters of the two types of sheath and blade that occur in Bambuseæ, and which do not obtain, so far as I know, in any other tribe of grasses. In a communication which Mr. Mitford has been good enough to make to me on this subject, he has formulated his views as follows, and has kindly allowed me to introduce them here.

"The sheath is an organ playing so important a part in the life of the Bamboo that it deserves something more than a cursory notice. In the grasses generally the sheath is regarded by botanists as taking the place of the petiole of the leaf. It happens, however, that the leaves of most Bamboos-indeed of all the hardy Bamboos -have a distinct continuation of the midrib of the leaf attaching it to the sheath and articulated, which continuation might perhaps be correctly termed a petiolule. The Bamboos, as it appears, bear sheaths of two types. There is first of all the series of sheaths which, borne one on each node and wrapped tightly round the culm or branch, as the case may be, protect it during growth. This form of sheath is divided or split transversely into two members, the ligule and the limbus or blade, the latter being what I would term a pseudophyll, or false leaf, sessile, lacking both midrib and petiole, varying in size in the different species, but always the first part to wither and disappear. In some Bumboos—those of the Phyllostachys group this sheath falls away as soon as branching takes place; in others, of the Arundinaria group, it remains, and having guarded the tender growth of the parent culm or branch it springs aside with the young branches or branchlets, devoting the remainder of its life to their protection until they can stand alone.

"Then there is the second form of sheath bearing a true leaf with petiole and midrib. This is the form assumed by the two, three, or four sheaths at the top of each culm branch and branchlet above the topmost node where branching ends. This true leaf is persistent upon the sheath. The ligule is present, as in the first

type, but the deciduous pseudophyll is replaced by an evergreen leaf.

"An interesting question arises as to whether there is any transition stage between the two types of blade, or whether the change is always sudden. I think that in many Bamboos I can trace such a transition stage; that is to say, that each successive pseudophyll on the stem becomes more and more like a true leaf, something of the nature of an arrested midrib being perceptible in the pseudophylls which are found near the top of the culm, though it is not until the last branching node has been passed that the true leaf-bearing sheaths occur. The principle remains inviolate (throughout the hardy species at any rate), and the distinction between the two classes of sheaths is absolutely maintained."—A. B. F. M.

I would remark in conclusion that Mr. Mitford's observations, extending to the nervation of the leaves of Bamboos, lead him to the conclusion that of those cultivated by him in the open air in the middle of England, the truly hardy only have tessellated leaves; the tender, such as Arundinaria Falconeri and falcata, having very incon-

spicuous transverse nervules, or none. - J. D. H.

Subtribe I. Arundinariez. (See p. 91.)

132. ARUNDINARIA, Michx.

Erect or climbing shrubs. Stems slender, nodes usually prominent, internodes rather short, branches short fascicled. Stem-sheaths papery, straw-colrd., blade subulate. Leaves usually small, jointed on the sheath. Infl. on separate stems, or terminal, or on leafing branches. Spikelets 1— many-fld., compressed, usually all bisexual, except sometimes the terminal, often sheathed; empty gls. 2, unequal, membranous; fig. gls. longer, obtuse acute or mucronate, many-nerved; palea 2-keeled. Lodicules 3, ciliate. Stamens 3, rarely up to 6. Ovary globose above; style short, stigmas 2-3 plumose. Grain ovoid or narrowly oblong, dorsally furrowed, included in the gl. and palea.—Species about 50, 14 American, 1 African, the rest Asiatic.

- A. Species of which the flowers are known.
- Sect. 1. Erect shrubs; infl. on leafy branches; bracts of infl. small. Stamens 3.
 - * Nodes of stem not spinous. See also A. Pantlingi.
 - † Spikelets many, in large terminal panicles.
- 1. A. Walkeriana, Munro in Trans. Linn. Soc. xxvi. (1868) 21; leaves shortly stoutly petioled thick elliptic to oblong-lanceolate pungent acuminate tessellate base rounded margins cartiláginous recurved spinuloseserrate. Bedd. Fl. Sylv., Forest. Man. p. ccxxx.; Gamble Bamb. Brit. Ind. 3, t. 1; Trim. Cat. Ceyl. Pl. 110.

TRAVANCORE; Pulney Hills, Beddome. CEYLON; Walker. Thwaites.

Stems 1 in. diam., thickly clothed above with sheaths of fallen leaves, internodes about 15 in. Leaves 5-11 by 1-1½ in., base cucullate, midrib narrow, nerves 6-10 pairs; sheath glabrous, mouth truncate ciliate, margin with curved bristles; ligule short. Panicle 6-12 in., red-purple, branchlets fillform, lower axils glandular and upper sparsely hairy. Spikelets up to 1 in. when mature, narrow, glabrous, 3-4-fld.; rachilla flattened, ciliate; gl. I and II subequal $\frac{1}{10-5}$ in., I usually 3-nerved; II, 5-or more-nerved, apiculate, ciliate; flg. gls. larger, with 2 prominent nerves and intermediate fluer ones; keels of palea ciliate.—Probably flowers frequently.

2. A. Wightiana, Nees in Linnwa, ix. (1834) 482; shrubby, slender, leaves thin shortly petioled long-acuminate tessellate base rounded or narrowed margins incurved scabrid, spikelets 3-5-fld. in dense leafy spreading panieles long-pedicelled, fl. gls. obtuse. Rupr. Bamb. 26, t. 3, f. 10; Munro in Trans. Linn. Soc. xxvi. (1868) 19; Bedd. Fl. Sylv., Forest. Man. p. ccxxx., Anal. Gen. t. 28; Brandis For. Fl. 563; Steud. Syn. Gram. 335; Thw. Enum. Pl. 1944; Gamble Bamb. Brit. Ind. 4, t. 2.

MALABAR & TRAVANCOE, alt. 6-8600 ft., Wight, &c. CRYLON; Pedrotallagalla, alt. 8000 ft., Thwaites (CP. 3860).

Gregarious, rhizomes branching. Stems 6-10 ft., or higher; nodes swollen, girt with a hairy ring; internodes 10-14 in., usually flattened on one side and rough, young strongly striate; branchlets whorled. Stem-sheaths 4-8 by 1-3 in., narrowed slightly upwards, base hispid with golden tubercle-based hairs, limb 1-1½ in., subulate, scabrid. Leaves 5-7 by ½-1 in., glabrous above, glaucescent beneath, midrib usually glaudular-pubescent, nerves 5-7 pairs; sheaths striate, keeled, often purple, sometimes hispid with tubercle-based hairs, mouth 5-8-setose, margins ciliate; ligule short, obtuse. Spikelets 3-5-fid., purple, glabrous or scabridly hirsute; gls. I and II ovate, acute; I 5- II 7-nerved; fl. gls. ovate, 9-11-nerved, mucronate, scabrously hispid; palea 2-ccspidate, 3-nerved and transversely nervuled, keels ciliate.—Flowers annually.

Var. β . hispida, Gamble l. c.; leaf sheaths and stems thickly clothed with tubercle-based golden hairs, internodes more flattened on one side. A. hispida, Steud. l. c. A. moliniformis, Hochst. in Herb. Hohenack. n. 1282.

3. A. floribunda, Thw. Enum. Pl. Zeyl. 375; internodes retrorsely hirsute, leaves thin lanceolate acuminate spinulose-serrate tessellate narrowed into a very short 2-glandular petiole, spikelets 5-8-fld. minutely silkily pubescent, fl. gls. acuminate. Munro in Trans. Linn. Soc. xvi. (1868) 20; Beddome Fl. Sylv. Forest. Man. p. ccxxx.; Trim. Cat. Ceyl. Pl. 110; Gamble Bamb. Brit. Ind. 6, t. 3.

CEYLON; Maturatte district, alt. 5000 ft., Thwaites (CP. n. 2624).

VOL. VII.

Stems 2-5 ft., erect; internodes 2-4 in. Leaves glabrous, primary nerves 8-4 pairs: sheath sometimes hispid with tubercle-based hairs, ending in a ciliate mem-

brane below the petiole and short auricles with 5-8 twisted bristles; ligule short. Panicle large, with slender filiform branches appressed at first, axils glandular. Spikelets about 1 in., gl. I $_{10}^{-1}$ in., acute, 3-nerved, tip ciliate; II longer, more nerved; fl. gls. 3 in., acuminate, 7-9-nerved, tip ciliate; keels of palea ciliate; grain $\frac{1}{2}$ in., red.

- †† Spikelets few, in short panicles.
- 4. A. elegans, Kurz in Journ. As. Soc. Beng. xlii. (1873) 248; For. F7. Burma, ii. 549; stems slender, internoles smooth, leaves linear-lanceolate long acuminate tessellately nerved, margins cartilaginous scabrid, spikelets long 7-8-fid. in a terminal interrupted panicle or raceme pedicelled flattened, fl. gls. distant acuminate. Gamble Bamb. Brit. Ind. 6, t. 4.

UPPER ASSAM; Naga Hills, alt. 5500 ft., Rollo. BURMA, Poneshee, J. Anderson;

Tenasserim and Martaban, alt. 5-7500 ft., Kurz, &c.

Stems 12-20 ft. high by $\frac{1}{10}$, $\frac{1}{10}$ in. diam.; internodes 7-9 in., flattened on one side, smooth; sheaths \(\frac{1}{2}\) the length of the internodes, papery, hispidulous, upper \(\frac{1}{2}\) narrowed to a truncate minutely auricled mouth; blade subulate, recurved. Leaves 4-5 by $\frac{1}{10}$ \(\frac{1}{2}\) in., base narrowed into a very short petiole, midrib yellow, primary nerves 4-6 pairs; sheath smooth, striate, tipped with a ciliate callus, auricles bristly; ligule very short. Spikelets 1 in. or more; gl. I and II \(\frac{1}{2}\) in., ovate, acuminate, 3-5-nerved, keel ciliate; fl. gls. similar, 7-nerved and transversely nervuled; pales obovate, 2-fid, 2-nerved between the white-ciliate keels and 1-nerved on each side of them.

5. A. polystachya, Kurz ex Gamble Bamb. Brit. Ind. 7, t. 5; stems soft, leaves thin soft lanceelate acuminate with a twisted tip, rough above white bairy or smooth beneath not or rarely tessellately nerved margins scabrous ligule long, spikelets long 4-6-fld. in a large terminal or axillary racemose leafy panicle with papery bracts, fl. gls. distant ovate long-acuminate.

SIKKIM HIMALAYA & the KHASIA HILLS, alt. 3-5000 ft., Griffith, Kurz, Mann, &c.

- A small shrubby bamboo; stem-sheaths unknown. Leaves 6-8 by $\frac{1}{10}$ -1 in., base rounded or narrowed, petiole very short, midrib rather broad, principal nerves 5 pairs, with lines of pellucid glands between the secondary, transverse nervules few or 0; sheath greenish yellow, striate, glabrous, ending in a broad 2-fid callus, and produced upwards to meet the long striate obtuse fimbriate ligule. Spikelets $\frac{1}{2}$ - $\frac{7}{10}$ in., rachilla clavate; gls. I and II ovate, acuminate, 5-7-nerved, keeled and ciliate above; fl. gls. about twice as long, 7-9-nerved, ciliate; palea longer, mucronate, tip 2-fid, 1-nerved between and 1-nerved on each side of the ciliate keels.
- 6. A. debilis, Thir. Enum. Pl. Zeyl. 375; shrubby, stems much branched, leaves small linear-lanceolate acute obscurely or not tessellate tip scabrous base acute or subtruncate, ligule short, spikelets short 3-fid., shortly pedicelled in a terminal short leafy panicle, fl. gls. imbricating ovate mucronate. Munro in Trans. Inn. Suc. xxvi. (1868) 24; Bedd. Fl. Sylv., Forest. Man. p. ccxxx.; Trim. Cat. Ceyl. Pl. 110; Gamble Bamb. Brit. Ind. 7, t. 6.

CEYLON; Central Province, alt. 6-8000 ft., Thwaites, &c. (C.P. n. 1).

Stems elongate; nodes rather enlarged, internodes 2-6 in. by \(\frac{1}{10}\) in. diam., upper smooth yellow shining, lower glabrous or top hispid with long hairs. Leaves 1\(\frac{1}{2}\) by \(\frac{1}{1}\) in, glaucous, glabrous, or hairy above glabrous beneath, one or both margins scabrous; midrib thick, primary nerves 2-3 pairs, obscure, transverse

nervules obscure or 0; sheath glabrous, striate, paleaceous, ending in a ciliate callus and shortly auricled, with 2-4 short bristles. Spikelets \(\frac{1}{2} \) in., pedicels often obcuneate, glabrous or slightly pubescent; gls. I and II ovate, mucronate, 5-7-nerved; fl. gls. similar but longer; palea 2-cuspidate, hirsute, tip ciliate, keels smooth.

††† Spikelets racemose.

7. A. densifolia, Munro in Trans. Linn. Soc. xxvi. (1868) 32; small, densely gregarious, leaves leathery densely imbricate subsessile lanceolate acute or long-acuminate spinulose-serrate tessellately nerved, base rounded or cordate, spikelets 1-fid. in a dense panicle of leafy branchlets bearing racemes of 5-6 spikelets, fl. gl. long-mucronate. Trim. Cat. Ceyl. Pl. 110; Gamble Bamb. Brit. Ind. 8. t. 7.

TRAVANCOR; on the Anamallay Hills, alt. 8500 ft., Beddome. CRYLON; Horton Plains, alt. 7200 ft., and Pedrotallagalla, G. Thomson, Maxwell, Trimen, &c.

Stem 6 in.-3 ft., with stiff strong leafy branches arising from a thick scaly rhizome; internodes 1½-3 in. by ½ in. diam. or less, smooth, walls rather thick; stem-sheaths 1 in. or longer, striate, hirsute, narrowed to the truncate acutely 2-auricled top; blade short, ovate. Leaves 1-1½ by ½-½ in., tip glabrous, margins broadly cartilaginous, midrib thick, primary nerves 1-2 obscure, secondary 4-5 regularly tessellate with nervules; sheath striate, ciliate with whitish stiff hairs above; ligule short, rounded, hairy. Spikelets ½-½-½ in., rachilla glabrous; gl. I short, lanceolate; 11 broader, 5-nerved, keel scabrous; palea 2-mucronate, with a faint nerve outside each seabrid keel. Lodicules obovate, fimbriate. Anthers long. Ovary ellipsoid.

8. A. racemosa, Munro in Trans. Linn. Soc. xxvi. (1868) 17; stem erect from a long rhizome, internodes scabrous, leaves linear-lanceolate tessellate tip setaceous, margins scabrous-serrulate, spikelets 4-5-fld. on short racemes of a simple terminal panicle of close leafy whorled branches surrounded by persistent sheaths, flg. gls. caudate-acuminate from a broad base ciliate. Gamble Bamb. Brit. Ind. 9, t. 8; Mitford, The Bamboo Garden, 174. A. Gammieana, Gamble mss. (an Alpine form).

E. NEPAL and SIKKIM, alt. 6-12,000 ft.

Stems 5-15 ft. by 10-2 in. diam., walls thin, nodes a mere ring; internodes 12-15 in., blue-green when young; branches fascicled at the nodes; stem-sheaths usually 10 in., striate, covered with scattered stiff black hairs, narrowed convexly to the truncate tip; blade subulate, reflexed. Leaves 4-7 by \(\frac{1}{2}\) \(\frac{1}{2}\) in., base rounded or narrowed into the very short petiole, glabrous or sparsely hairy above, midrib prominent, primary nerves 3-5 pairs, secondary 5-7; transverse nervules conspicuous; sheath 2-auricled with a ciliate membrane below the blade; liquie short, obtuse. Panicle with a glabrous rachis, pedicels 1-1\(\frac{1}{2}\) in., wavy, angular. Spikelets 1-1\(\frac{1}{2}\) in., rachilla clavate; gl. I and II very small, distant, acuminate; fig. gls. 7-9-nerved, setaceous, tip scaprid; palea shorter, 2-mucronate, tip scabrous, keels ciliate, nerves 0 or obscure.—Flowers rarely and only in the higher elevations, when the stem is sometimes reddish.

- ** Nodes of stem spinous (except A. Pantlings).
- 9. A. Griffithiana, Munro in Trans. Linn. Soc. xxvi. (1868) 20; gregarious, internodes furrowed, nodes girt with a ring of tawny hairs, leaves thin linear-lanceolate acuminate tessellate margins smooth, tips setaceous, spikelets 4-6-fld, in whorled clusters on a terminal panicle which is surrounded by sheathing bracts, pedicels hairy, flg. gls. lanceolate long-mucronate. Gamble Bamb. Brit. Ind. 10, t. 9.

BRITISH BRUTAN, Pantling. KHASIA and JAINTEA HILLS, alt. 3-4500 ft., Grifith, &c.

Stoms 10-30 ft. by 1-1; in. diam., olive-green; spines short, stout; internodes

7-9 in., stem-sheaths 6-9 in. by 4-5 in. broad at the base and $\frac{2}{10}$ in. at the top, with a basal belt of thick soft tawny hairs, narrowed upwards, tip with rounded auricles, thinly covered with stiff tubercle-based hairs; blade $\frac{1}{2}$ in., triangular, acute, hairy. Leaves 4-5 by $\frac{1}{2}$ in. or less, narrowed into a petiole, margins smooth, midrib shining, primary nerves 4-5 pairs, transverse nervules strong; sheaths striate, glabrous, ending in a narrow ring with a few stiff curved bristles; ligule rather broad, hairy. Panicle with a hairy rachis, laterally flattened. Spikelets $1-\frac{1}{4}$ in., narrow; rachilla long, flattened, top clavate, ciliate; gls. I and II ovate-lauceolate, mucronate, 5-7-nerved, scabrous, dorsally hairy above; fl. gls. $\frac{1}{4}$ in., scabrous, hairy above, 7-nerved; palea 2-mucronate, keels ciliate. Anthers with bearded tips.—Only once seen in flower.

10. A. Pantlingi, Gamble Bamb. Brit. Ind. 129, t. 118; tall, spines 0? nodes with a hairy ring, leaves lanceolate petioled tessellate smooth above scabrid on one margin, tip long twisted scabrid, spikelets panicled surrounded by sheathing bracts, pedicels glabrous capillary, nodes glandular, spikelets very narrow curved 6-10-fld., rachilla clavate with a tuft of white hairs beneath the ovate acuminate long-mucronate fig. gls.

BRITISH BHOTAN; on Rechi La, alt. 11,000 ft., Pantling.

Stems upwards of \ in. diam., smooth; internodes 7-8 in. or more, cavity large; stem-sheaths about 10 in., smooth, striate, tapering to a convex top, margins longciliate; blade 3-4 by 1-1 in., glabrous, decurrent on the sheath into hairy auricles bearing 6-10 long curved bristles; ligule about In in., toothed, faintly ciliate, dorsally pubescent. Leaves 5-7 by \(\frac{1}{2}\) in., base narrowed, petiole \(\frac{1}{2}\)-\frac{1}{2}\) in., midrib narrow pale shining, nerves 4-5 pairs with 7-9 intermediate pairs, cross-nervules very many, sheath glabrous, ending in a very hairy ring with a few twisted bristles, margins long-ciliate; ligule dorsally pubescent. Panicles 4-6 in., terminal and axillary on leafless branches; bracts like small stem-sheaths, glabrous. Spikelets 2 in. or more, subverticillate; uppermost fig. gls. usually empty; rachilla about 1 in., whitepubescent; gls. I and II empty, I + in.; II nearly + in., 3-5-nerved, subciliate; fig. gls. prominently 7-nerved, keels schorid; palen with 2-ciliate keels alternating with 3 nerves, tip 2-fid and 2-mucronate. Lodicules 3, ovate or obovate, scute, ciliate. Anthers linear, acute. Ovary glabrous, style short; stigmas 3, long, plumose. Grain oblong, dark brown, grooved, tipped with the style-base .- Differs from A. Griffithiana in wanting spines, in the different stem-sheaths, large leaves, longer spikelets, and glabrous anther tips.

11. A. callosa, Munro in Trans. Linn. Soc. xxvi. (1868) 30; internodes smooth, nodes girt by the base of the fallen sheath, leaves thin oblong-lanceolate acuminate tessellate glandular-scabrid above pubescent beneath, margins scabrous-serrulate, spikelets bracteate 6-12-fld. in a branched axillary punicle ending in a leafy branchet, fig. gls. ovnta acute mucronate. Gamble Bamb. Brit. Ind. 12, t. 10.

EASTERN HIMALAYA; in the Duphla Hills, alt. 4500-6600 ft., Lister. KHASIA

HILLS, alt. 6000 ft., J. D. H. & T. T., &c.

Stem 12-20 ft. by \(\frac{1}{2}\)-1 in. diam., smooth; nodes spinous and with a ring of soft brown hairs; internodes 6-10 in., walls above the spinous thickened nodes thin; stem-sheaths as long as the internodes or longer, thin, transversely nerved, narrowed from a softly hairy base to a narrow truncate tip; blade \(\frac{1}{2}\)-1 in., subulate, hairy ou both surfaces, suricles short fringed decurrent. Leaves 8-9 by \(\frac{1}{2}\)-1 \(\frac{1}{2}\) in., narrowed from a suboblique base to the very short petiole, tip scabrous, midrib hairy shining above, primary nerves 5-8 pairs, transverse nervules raised beneath with interposed pellucid glands; sheath densely tawny-pubescent, at length glabrous, tip with a ciliate callus and a few stiff curved bristles; ligule short, huiry. Passicle with the rachis striate, flattened on one side, and with a pubescent vertical line, terminal joints clavate, hairy; bracts narrow, straw-colrd. Spikelets 2-3 in., rachilla very

prominent, glabrous; gl. I and II short, ovate, acute, glabrous, 1-3-nerved; fig gls. ovate, 3-7-nerved, tip ciliate; palea acute, thickly pubescent, keels ciliate. Anthers short, obtuse.

- Sect. II. Erect shrubs. Infl. of fascicled racemes on leafless or on both leafy and leafless stems; bracts small.
- 12. A. falcata, Nees in Linnæa, ix. (1834) 478; stems annual, internodes smooth, nodes swollen, leaves small linear shortly petioled scabrid glandular between the nerves, above not tessellate tip setaceous twisted, infl. of fascicled falcate racemes at the nodes, bracts short narrow membranous, fig. gls. 1-2 subacute mucronate 7-9-nerved, tips ciliate. Gamble Bamb. Brit. Ind. 12, t. 11, 12; Mitford, The Bamboo Garden, 167. PA. utilis, Clegh. in Journ. Agr. Hort. Soc. Ind. xiii. (1865) 388.

WESTERN HIMALAYA; from the Bavi to Nepal, alt. 4-12,000 ft. (rarely over 7000 ft.).

- Stems 6-10 ft. from a woody rootstock, $\frac{1}{3} \frac{1}{2}$ in. diam., green, sometimes pruinose; nodes glabrous or hirsute; internodes 6-12 in., walls thin; stem-sheaths papery, often 12 by 3 in., glabrous and scaberulous above, hairy beneath above the middle, margins ciliate, tapering to a truncate tip; blade $\frac{1}{2} 2$ in. by $\frac{1}{10}$ in., subulate recurved; ligule often $\frac{1}{2}$ in., toothed. Leaves about 3-4 by $\frac{1}{3} \frac{1}{3}$ in., or 12 by 1 in. on young shoots, glands in rows like nervules pellucid; sheath glabrous; ligule long. Panicles on separate stems. Spikelets $\frac{1}{2} \frac{2}{3}$ in.; rachilla cuneate, tip hairy; gl. I $\frac{1}{3}$ in., 3-5-nerved; II longer, 7-9-nerved, tip acute ciliate; fl. gls. $\frac{1}{2}$ in., mucronate, scabrous; palea = fl. gl. or rather longer (margins of gl. and palea often black).— There are two vars.: a. typica, Gamble, spikelets distant in filiform falcate racemes; β . glomerata, Gamble, spikelets 3-4 together in close racemes or panicles.—A. utilis, Clegh., may be falcata or spathifora.
- 13. A. khasiana, Munro in Trans. Linn. Soc. xxvi. (1868) 28; stems annual, dark green or blackish, nodes prominent, branchlets fascicle dark colrd., leaves 3-4 by $\frac{1}{3}$ in. linear-lanceolate glandular between the nerves not or hardly tessellate, infl. of fascicled falcate geniculate panicles at the nodes, bracts short ovate, fl. gl. mucronate, margins above and tip ciliate. Gamble Bamb. Brit. Ind. 15, t. 13.

KHASIA HILLS; alt. 5-6000 ft., common.

Most difficult to separate from A. falcata, but a stiffer stronger plant, panicle more dense and imbricated, flowers shorter, rachilla of spikelet hairy.

14. A. intermedia, Munro in Trans. Linn. Soc. xvi. (1868) 28; stems 8-12 ft. slender, nodes swollen with a prominent ring and whitish line below them, leaves very variable 8 by 1 in. (in young shoots to 3-4 by $\frac{1}{2}$ in.) linear- or oblong-lanceolate setaceously acuminate, base narrowed into a swollen petiole, nerves 3-7 pairs with 6-7 intermediates, sparingly tessellate with interposed pellucid glands, sheath ciliate with falcate auricles, infl. of whorled racemose panicles, bracts axillary triangular, spikelets 3-5-fid., fl. gls. 7-9- nerved. Gamble Bamb. Brit. Ind. 15, t. 14.

SIKKIM HIMALAYA, alt. 4-7000 ft., J. D. H., &c.

Stems greyish-green; internodes 5-10 in, walls $\frac{1}{10} - \frac{1}{8}$ in. thick; stem-sheaths 8-10 by 1-2 in. at base, glabrous, striate, narrowed upwards and truncate, ciliate below the small subulate blade. Leaves bright green, upper surface and margins scabrid, midrib prominent; sheath with long marginal hairs, a minute ciliate callus below the petiole and on each side a falcate auricle bordered by stiff curved bristles; ligule long. Inf. on leafless stems. Spikelets $\frac{1}{8}$ -1 in., yellow or purplish, nodes of racbilla clavate long-ciliate; gl. I and II ovate, membranous.—The long ciliate leaf-sheath is an excellent character.

15. A. Hookeriana, Munro in Trans. Linn. Soc. xxvi. (1868) 29; stems 15-20 ft. slender, nodes not much swollen ringed by the base of the sheath, leaves 6-12 by $\frac{1}{2}$ - $\frac{1}{3}$ in. narrowed into a swollen petiole, nerves 4-8 pairs with oblique transverse pellucid glands not tessellate, sheath glabrous minutely ciliate, ligule long, infl. of loosely fascicled falcate bracteate panicles, spikelets drooping 1-fid., fl. gl. large broadly ovate 3-nerved. Gamble Bamb. Brit. Ind. 17, t. 15.

EASTERN HIMALAYA, alt. 4-7000 ft.; Sikkim and W. Bhotan, J. D. H., Gammie,

Stems 15-20 coespitose, glaucous green, with white scurf when young; older internodes 8 by $\frac{1}{4}$ - $\frac{1}{4}$ in., with a dark blueish ring at the top, often striped green and yellow, walls $\frac{1}{10}$ in. thick; stem-sheaths often 12-24 in. by 3-6 in. broad at the base, narrowed upwards and truncate; blade 3-6 in., linear; ligule $\frac{1}{10}$ - $\frac{1}{4}$ in., depressed in the middle. Leaves glaucous green when young, upper surface and margins scabrid; sheath ending in a broad callus and thin naked membrane. Infl. loose, on separate stems. Spikelets about $\frac{1}{4}$ in., pedicelled; gl. I $\frac{1}{10}$ in., 3-nerved, tip hairy; II $\frac{1}{4}$ in. 5-nerved, mucronate; fl. gl. hard, involute, angled, scabrous between the nerves; pales glabrous, tip hirsute. Grain ellipsoid.

Sect. III. Erect shrubs. Inflorescence usually in leafy panicles; bracts large.

16. A. spathiflora, Trin. in Mem. Acad. Petersb. Ser. VI iii. II. (1835) 617, Sp. Gram. Ic. t. 350; stem-sheaths oblong tip rounded, leaves 2-4 at the end of the brancher, 3-5 by $\frac{1}{3}-\frac{1}{2}$ in. linear-lanceolate tessellate, sheath loose, bracts enclosing 2-3 compressed 4-8-fld. spikelets, gl. I short obtuse, II long-mucronate, fig. gls. 4-5 ovate long-acuminate, palea very short. Ruprecht. Bamb. 24, t. 2, f. 5; Steud. Syn. Gram. 334; Brandis in Ind. Forester, xii. 206; Gamble Bamb. Brit. Ind. 17, t. 16; Mitford, The Bamboo Garden, 172. A. procera, Wall. mss. Thamnocalamus spathiflorus, Munro in Trans. Linn. Soc. xxvi. (1868) 34, partly; Brandis For. Flor. 563. Bambusa macro, Wall. in Herb. Hook. (ex Munro).—Gen. Nov. Wall. Cat. n. 5041.

Western Himalaya; from the Sutlej to Nepal, alt. 7-9000 ft., Wallich, &c. A gregarious shrub 12-20 ft. high. Stem \(\frac{1}{2} \) \(\frac{1}{4} \) in. diam., smooth, young glaucous green and scurfy, older yellow or reddish-brown, nodes prominent, internodes 6-15 in., branchlets chiefly from the upper nodes, leafing branches with loose yellow sheaths 3-5 by \(\frac{1}{3} \) in. Stem-sheaths loose, glabrous, margins ciliate, mouth \(\frac{1}{4} \) in. broud, with a few stiff bristles; ligule \(\frac{1}{10} \) in., finbriate. Leaves shortly petioled, base narrowed, tip acute hairy; sheath 2-3 in., truncate, auricles bristly callus narrow, ciliate; ligule long-ciliate. Infl. usually on leafless stems, branches fascicled drooping, with narrow papery sheaths, 1\(\frac{1}{2} \) in. long. Spikelets 1-2\(\frac{1}{2} \) in. pedicelled; ra-hilla long, clavate, tip hairy; gl. I and II linear-lanceolate, glabrous; ft. gls. \(\frac{1}{2} -1 \) in. scabrous.—Distinguished from A. falcata by the tessellate leaves, and from jaunsarensis by the short rhizomes and tufted habit.

17. A. aristata, Gamble Bamb. Brit. Ind. 18, t. 17; stem-sheaths narrowed to a broad rounded top, leaves fascicled on jointed purple branchlets oblong-lanceolate tessellate, sheath loose keeled with a thickened spongy callus below the petiole, bracts of infl. broad enclosing 3-5 compressed 4-8-fld. spikelets, gl. I and II oblong-lanceolate scabrous 5-7-nerved, fl. gls. ovate long acuminate, palea nearly as long. Thamnocalamus spathiflorus, Munro in Trans. Linn. Soc. xxvi. (1868) 34, partly.

SIRKIN and BHOTAN HIMALAYA, alt. 9500-11,000 ft., Griffith's Collectors,

Kurs, &c.

A gregarious shrub 8-12 ft. high, very closely allied to A. spathifora, of which it is the Eastern representative, distinguished from that species in having broader bracts enclosing more spikelets, shorter leaves, a hairy callus below the longer petiole, longer mucros of the fig. gls. and a long more acuminate palea. It is readily recognized by its yellow stems and reddish branchlets. The stems are leafing only, or flowering only, or both.

18. A. Falconeri, Benth. in Gen. Plant. iii. 1208; stem-sheaths oblong top narrowed truncate, leaves 3-6 by \(\frac{1}{2} - \frac{3}{4} \) in. oblong-lanceolate soft thin petioled not tessellate but with a few pellucid glands, sheath glabrous with ciliate margius and a minute narrow ciliate callus below the petiole, ligule long hairy, bracts of large leafy panicles ovate-lanceolate, spikelets 1.fld., gl. I and II oblong acute or mucronate 3-5-nerved, fl. gl. ovate-lanceolate mucronate 5-7-nerved, palea as long or longer. Gamble Bamb. Brit. Ind. 20, t. 18; Mitford, The Bamboo Garden, 169. Thamnocalamus Falconeri, Hook. f. ex Munro in Trans. Linn. Soc. xxvi. (1868) 1834; Brandis For. Fl. 563. Bambusa floribunda, Munro in Herb. Trin. Coll. Dublin.—Bambusoides, Wall. Cat. n. 5040.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 7-9000 ft., Wallich, &c. Tall, shrubby. Stem \(\frac{1}{2} \) in. diam., young smooth, old scurfy-white, often striped yellow and green; nodes raised, base of sheath persistent; internodes 8-15 in., walls \(\frac{1}{2} \) in. thick; branches many at the nodes with bracteate sheaths. Stem-sheaths 8-12 by 2-3 in.; ligule narrow, dark, hairy. Leaves smooth on both sides, ligule rounded hairy. Rachis of raceme flexuous, flattened. Spikelets with a terminal free rachilla, and a ring of hairs below the fig. gl.; keels of palea glabrous except at the tip, 1-nerved on each side.—The small sheaths enclosing short sinuous racemes, and the absence of transverse nervules in the leaves characterize this species.

Sect. IV. Climbing shrubs. Stamens 6 or fewer.

19. A. Prainii, Gamble Bamb. Brit. Ind. 21, t. 19; stem slender wiry, leaves 2-4 by \(\frac{1}{2} \) \(\frac{1}{2} \) in. not tessellate, sheath with a glabrous callus below the petiole, spikelets distant pedicelled on a wiry rachis, gl. I lanceolate keeled ciliate, II ovate acute 5-nerved, flg. gls. 3-6 on a flexuous clavate rachilla triangular acute 9-11-nerved. Microcalamus Prainii, Gamble in Journ. As. Soc. Beng. lix. ii. (1891) 207, t. 7.

ASSAM; on the Naga and Jaintea Hills, alt. 3500-7870 ft., Prain, &c.

Stem up to 30 ft. long, yellowish, \(\frac{1}{2}\)-\frac{1}{2} in. diam.; nodes swollen, solid or walls thick; branches fascicled. Stem-sheaths 2-6 by \(\frac{1}{2}\)-\frac{2}{2} in., narrowed to a point in the upper half with an acicular blade. Leaves 2-4 in. thin, quite glabrous, base rounded petioled, tip curved setaceous; sheath smooth; ligule long, rounded. Inf. of axillary and terminal panicles of spikelets in the axils of sheathing bracts. Spikelets 1-1\(\frac{1}{2}\) in., pedicels slender; empty gls. 2-3, nodes of rachilla clavate flattened; gl. I margins ciliate; II tip ciliate; fl. gls. falcate, strongly nerved; palea as fong, talcate; keels minutely ciliate. Stamens 6.

- B. Species of which the flowers are unknown.
- * Stem-sheaths 2-8 in., imperfect blade generally recurved.
- t Leaves tessellate with transverse nervules.
- § Stems tufted on a short rootstock.
- 20. A. microphylla, Munro in Trans. Linn. Soc. xxvi. (1868) 32;

stems 2-4 ft., leaves $\frac{1}{3}$ -1 by $\frac{1}{10-l}$ in linear-lanceolate acute mucronate tessellate, sheath hairy above tip long-fimbriate. Gamble Bamb. Brit. Ind. 22. Bambusa microphylla, Griff. Journ. i. 242, 259, &c.

BHOTAN, alt. 6-10,000 ft., Griffith.

A gregarious low shrub, forming large patches in wet places; internodes 2-3 in., glabrous; branches 1-whorled at the nodes. Leaves with almost membranous fimbriate or glabrous margins, nerves 2 pairs; sheath often dark; ligule obscure.—Descript, after Munro.

21. A. hirsuta, Munro in Trans. Linn. Soc. xxvi. (1868) 30; stems 4-8 ft. solitary from the rhizome often strigosely hairy above, leaves 3-5 by $\frac{1}{2}$ in. tessellate strigosely hairy beneath, sheath strigosely bristly ending in a hairy callus and reflexed spinescently bristly auricle. Gamble Bamb. Brit. Ind. 22, t. 20.

KHASIA and NAGA HILLS, alt. 5000-9500 ft., Griffith, &c.

Stems greyish-green, 1-1 in. diam., nodes glabrous; internodes up to 13 in., walls rather thin. Stem-sheaths 6 in. by 1 in. broad at the base, top rounded with large recurved long-ciliate auricles; blade subulate, recurved; ligule narrow, pubescent. Leaves tessellate, smooth above, hairs white beneath, margins cartilaginous scabrous-serrate, midrib narrow shining, nerves 4-6 pairs; ligule long, hairy.—Resembles A. Wightiana, differing in the well marked auricles and bristles of both stem- and leaf-sheaths.

22. A. Gallatlyi, Gamble Bamb. Brit. Ind. 23, t. 21; stems thin, leaves 3-4 by $\frac{1}{3}$ in tessellate whitish beneath base narrowed into a short petiole sheath ending in a narrow callus with about 3 long stiff bristles.

TENASSERIM; Moolyet Hill, alt. 6000 ft., Gallatly.

A gregarious shrub. Branches smooth, glabrous, striate, sometimes channelled. Sheaths of branchlets narrow, with imperfect blades and long ligules. Leaves pale green, tessellate, tips setaceous, scabrid, smooth above, one margin scabrid, nerves 3 pairs; ligule triangular, pubescent.

- §§ Stems distant on clongated rhizomes.
- 23. A. jaunsarensis, Gamble Bamb. Brit. Ind. 23, t. 22; stems slender reed-like, leaves 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in. lanceolate acuminate tessellate base obliquely cureate, sheath ending in falcate auricles with a few bristles.

WESTERN HIMALAYA; hills of Jaunsar in Garwhal, alt. 7-8000 ft., Gamble.

Rhizoms long, creeping, clothed with shining imbricate ovate acute scales. Stems 2-3 ft. apart, 10-15 ft. high, \(\frac{1}{2}\) in. diam., young glaucous, old greenish-brown, internodes 9-11 in. Stem-sheaths 6-10 in. by \(1\frac{1}{2}\) in. broad at the base, narrowed to a truncate 2-auricled bristly tip; blade 1-3 in, subulate, recurved; ligule short, pubescent. Leaves thin, smooth above, scaberulous beneath, margins scabrous-serrate, tessellate, nerves 4-5 pairs; sheath with falcate auricles that bear 5-6 stiff bristles; ligule short, truncate, pubescent.—Nearest to A. spathiflora, distinguished by its rhizome, solitary green stems, auricled sheath, and thinner leaves.

24. A. Rolloana, Gamble Bamb. Brit. Ind. 24, t. 23; stems rather rough somewhat flattened on one side, lower nodes rooting, leaves 6-8 by $1-l\frac{1}{2}$ in. oblong-lanceolate acute tessellate base rounded sparsely hairy beneath, sheath ending in a rounded long-ciliate auricle.

Assam; Naga Hills, alt. 5-7000 ft., J. Rollo.

Rhizome at first clothed with imbricating scales, afterwards jointed, joints about $\frac{1}{2}$ in. long. Stems 8 ft. by $\frac{1}{2}-\frac{1}{2}$ in. diam., green then yellow, lower nodes rooting;

internodes 10-12 in., walls thin. Stem-sheaths 4-6 by 1-2 in., covered with at length deciduous bristles, shining, margins ciliate, auricles falcate and with long bristles, blade subulate recurved. Leaves glabrous above, tessellate, margins cartilaginous spinulose-scabrous, nerves 8-10 pairs; petiole broad, flat; ligule long, membranous, deeply cleft. Remarkable for its broad leaves.

25. A. armata, Gamble Bamb. Brit. Ind. 130, t. 119; rootstock creeping, stems solitary, nodes smooth slightly thickened, leaves oblong-lanceolate long-acuminate tessellate smooth above slightly rough beneath, margins scabrid, midrib pubescent above.

Hills of UPPER BURMA, alt. 5500 ft., Oliver.

Evergreen. Stems about 20 ft. by $1-1\frac{\pi}{4}$ in. diam., green, straight, smooth, walls very thin; nodes with a belt of straight smooth spines, internodes about 8 in.; stem-sheaths 6-8 in. by $2\frac{\pi}{4}-3$ in. broad at the base, thin, tapering to a very narrow tip, smooth or with scattered hairs above the middle, margins ciliate; blade about $\frac{\pi}{10}$ in., triangular, pubescent; ligule very narrow, ciliate. Leaves 6-9 by $\frac{3}{4}-1\frac{\pi}{4}$ in., bright green, base narrowed, petiole $\frac{1}{10}-\frac{\pi}{4}$ in., tip twisted scabrid, midrib narrow pale shining, nerves 6 pairs with 5-7 intermediate, transverse nervules very many irregularly spaced; leaf-sheaths striate, ending in small calli and bearing 10-12 stiff bristles; ligule very short, ciliate. Inflorescence unknown.—Near A. callosa, Munro, but quite distinct.

- †† Leaves not or inconspicuously tessellate by transverse nervules.
- 26. **A. suberecta,** Munro in Trans. Linn. Soc. xxvi. (1868) 32; stems coespitose wiry erect, leaves narrow 2-4 by $\frac{1}{3}$ - $\frac{1}{3}$ in. subsessile linear not or hardly tessellate, base narrowed margins revolute, sheath ending in a callus with a few deciduous bristles. Gamble Bamb. Brit. Ind. 25, t. 24.

SIKKIM HIMALAYA, Kennedy. KHASIA and JAINTEA HILLS, alt. 4000-5000 ft. Griffith, &c.

Stems 10-15 ft. by \(\frac{1}{2} \) in. diam., olive-green, smooth; nodes slightly swollen; internodes 6-10 in., walls thick; branchlets short, whorled. Stem-sheaths 2-6 by \(\frac{1}{2} \) in. broad at base, glabrous, gradually narrowed to a naked or fimbriate mouth; blade \(\frac{1}{2} \) -1\(\frac{1}{2} \) in., subulate, recurved; ligule long, tip fimbriate. Leaves pale beneath, with many pellucid glands, tip setaceous, margins scabrous-serrate, nerves 3-4-pair; ligule rather long, pubescent.

27. A. Kurzii, Gamble Bamb. Brit. Ind. 25, t. 25; nodes with a thick ring bearing very many long wiry geniculate branches, leaves 2-4 by $\frac{1}{5}-\frac{1}{3}$ in. subsessile very thin linear-lanceolate acute obscurely tessellate, base unequally narrowed, sheath slender striate, ending in a small callus and a few thin cilia.

SOUTHERN BURMA; on the coast, Kurz.

Apparently a bushy shrub. Stem smooth, \(\frac{1}{2}\)-\frac{1}{2}\) in. diam. Leaves acute with a short point, smooth on both surfaces with a few long tubercle-based hairs on the nerves beneath, costa thin pale, nerves 2 pairs, transverse nervules very few and inconspicuous; ligule short sometimes ciliate.—Remarkable for its thin leaves and geniculate pale branchlets.

- ** Stem-sheaths 12-18 in. long, blade long.
- 28. A. Mannii, Gamble Bamb. Brit. Ind. 26, t. 26; stem tufted climbing wiry solid, blade of stem-sheath 6-10 in. linear, leaves 6-9 by $\frac{3}{4}$ -1 in. petioled lanceolate hirsute beneath not tessellate.

ASBAM; Jaintea Hills, alt. about 3000 ft., Mann.

Stems 30 ft., much branched, nodes thickened, branches many geniculate; internodes 3 ft.. smooth. Stem-sheaths 12-18 in., convolute, slender; rough with

appressed bristles; ligule narrow, toothed. Leaves papery, base narrowed or rounded, tip thickened hirsute surmounted by a capillary bristle; sheath ending on one side in a round shining exauricled callus, on the other in a short pointed auricle with a few bristles; petiole wrinkled; ligule small, hairy, ciliate.—A curious species resembling A. Prainii, remarkable by its long narrow sheaths; its leaves resemble those of Cephalostachyum.

133. PHYLLOSTACHYS, Sieb. & Zucc.

Cospitose shrubs. Stems smooth, flattened on one side, branches fascicled at the nodes. Stem-sheaths rounded above, blade subulate. Leaves jointed on the sheath, spinulose on one margin, tessellate, sheath loose. Infl. of spicate branchlets in a leafy terminal panicle with imbricating bracts. Spikelets 2-3, 1-4-fld. with a terminal imperfect rachilla jointed between the fls.; empty gls. 2-3, many-nerved, often bearing an imperfect blade; flg. gls. ovate-lanceolate, acuminate, many-nerved; palea 2-keeled, many-nerved. Lodicules 2. Stamens 3. Ovary stipitate, rounded, glabrous, style long, stigmas 3.—Species about 20, Eastern Asiatic.

1. P. bambusoides, Sieb. & Zucc. in Abh. Akad. Münch. iii. (1843) 745, t. 5, f. 3; leaves thin, mouth of sheaths with long bristles. Steud. Syn. Gram. 339; Munro in Trans. Linn. Soc. xxvi. (1868) 36; Franch. & Sav. Enum. Pl. Jap. ii. 182; Gamble Bamb. Brit. Ind. 27, t. 27; Mitford, The Bamb. Gard. 155. P. megastachya, Steud. l. c. Bambusa reticulata, Rupr. Bamb. 58. B. bifoliæ, Sieb. mss. ex Munro.

UPPER ASSAM; Mishmi Hills (without flowers), Griffith .- DISTRIB. China,

Japan.

Stems 10-12 ft., \(\frac{1}{4}\) \(\frac{1}{3}\) in. diam., graceful, smooth, yellow, nodes glabrous, internodes short, branches semiverticillate. Stem-sheaths 6-10 in., thin, top contracted into a short neck then rounded and truncate, margins produced to meet the ligule with a few bristles; blade subulate; ligule long, toothed. Leaves 3-4 by \(\frac{1}{3}\) \(\frac{1}{3}\) in., oblong-lanceolate, tip setaceous, glaucous and with stiff white hairs beneath, nerves 5-6-pairs; petiole black, hairy; sheath keeled, ciliate on one margin, mouth with bristles on a short suricle; ligule rounded. Bracts of inf. short, obtuse, sheathing 3-5 spikelets and with an imperfect blade. Spikelets 1-1\(\frac{1}{3}\) in.; gl. I very large, sheath-like, truncate, with a green cordate blade; II oblique, keeled, few-nerved, keels ciliate; fig. gls. \(\frac{1}{3}\) in., ovate, acuminate, many-nerved; palea as long.— Description from Hongkoug specimens.

2. P. Mannii, Gamble Bamb. Brit. Ind. 28, t. 28; leaves thick, mouth of sheath nearly naked.

KHASIA HILLS, alt. 5000 ft., cult. (said to have come from the Naga Hills), Mann.

Stems 15-20 ft. by 1-1½ in. diam.; internodes 8 in., yellow. Stem-sheaths papery, 8-9 by 1-2 in., top rounded and truncate; blade 2-3 in., subulate; ligule broad, pectinate. Leaves 4-5 by ½-½ in., base rounded, tip shortly acuminate, glabrous or nearly so, one margin spinulose-serrate, costa prominent, nerves 5 pairs; sheath loose, ending in a narrow ciliate callus with a few bristles; ligule broad, long-pectinate. Inf. unknown.

134. BAMBUSA, Schreb.

Shrubs or trees, usually large and cospitose, rarely climbing; stemsheaths broad, blade often triangular. Leaves shortly petioled not tessel late by nervules, but sometimes by pellucid glands, sheaths variously auricled. Infl. generally a large leafless panicle bearing heads on spiciform branches, or of leafy panicles, or panicled spikes. Spikelets 1- many-fld.; lower gls. 1-4, empty or gemmiferous; fl. gls. ovate-lanceolate, uppermost imperfect; palea 2-keeled. Lodicules 2-3, membranous, ciliate, rarely 0. Stamens 6. Ovary oblong or obovate, tip hairy; style long or short, stigmas 2-3. Grain oblong or linear-oblong, furrowed on one side; pericarp thin, adherent.—Species about 50, Eastern Asiatic, Malayan, and one Australian.

In enumerating the nerves of the leaves the principal ones on each side of the midrib alone are given.

- A. Species of which the flowers are known.
- Sect. I. Arborescent (except B. nana and affinis). Stem not spinous. Spikelets cylindric, except B. Balcooa. Lodicules 3.
 - * Spikelets in loose heads.
- † Stem-sheaths with a triangular reniform or cordate blade, auricles large.
 - § Keels of palea more or less ciliate or toothed.
- 1. B. Tulda, Roxb. Fl. Ind. ii. 193; leaves linear-oblong or -lanceolate, spikelets 1-3 in. in interrupted clusters mixed with chaffy bracts usually 1-2 bracteolate 4-6-fld., lowest 3-4 gls. acute many-nerved usually gemmiparous, flg. gls. \(\frac{1}{2}\)-1 in. ovate acute acuminate or mucronate, palea shorter cymbiform, anthers obtuse glabrous purple, ovary obovate-oblong. Munro in Trans. Linn. Soc. xxvi. (1868) 91; Brand. For. Flor. 566; Kurz For. Fl. Burm. ii. 552; Gamble Bamb. Brit. Ind. 30, t. 29. B. Macala, Ham. ex Wall. Cat. n. 5026 A. B. trigyna, Roxb. mss. in Herb. Mus. Brit. Dendrocalamus Tulda, Voigt Hort. Suburb. Calcutt. 718.—Bambusa, Wall. Cat. n. 5026 A, 5027, 5030 B, C.

BENGAL, ASSAM, the NORTHERN CIRCLES, and BURMA, wild and cult.

Gregarious. Stems 20-70 ft., 2-4 in. diam.; nodes not swollen; internodes 1-2 ft., white-ringed below the nodes, walls \(\frac{1}{2}\) in. thick. Stem-sheaths 6-9 by 6-10 in. broad below, narrowed upwards, tip rounded or subtriangular, glabrous hairy or white-powdered; blade hairy within, auricles long-fringed. Leaves 6-10 by \(\frac{3}{4}\)-1\(\frac{1}{2}\) in., base usually rounded, tip subulate twisted, beneath glaucescent and puberulous, pellucid glands faint, nerves 6-10 pairs; petiole often hairy; sheath glabrous, ending in a smooth callus and oblong long-fringed auricle; ligule narrow, obscure. Infl. variable, from an immense radical leafless panicle to a short leafy panicle or spiciform branch; rachilla clavate, flattened, fragile; palea 5-7-nerved between the keels, tip penicillate. Ledicules 3.—Flowers gregariously and in single clumps.

2. B. nutans, Wall. Cat. n. 5031; stems solitary from a creeping rhizome, leaves linear-lanceolate tessellate with pellucid glands, ligale long obtuse hairy, spikelets in bracteate fascicles many empty or gemmiparous, fertile few \(\frac{3}{4}-1\) in., 2-3 lowest gls. neuter 3-7 fertile all ovate acute mucronate many-nerved puberulous within, pa'ea shorter ovate flattened keels overlapping long ciliate, anther-tips long apiculate or slightly penicillate, ovary subovoid. Munro in Trans. Linn. Soc. xxvi. (1868) 92; Brand. For. Flor. 567; Gamble Bamb. Brit. Ind. 32, t. 30. B. crinita, Thoms. ex Munro l. c. 157. Bambusa Falconeri, Munro l. c. 95 in part.—Bambusa, Wall. Cat. n. 5030 A.

LOWER HIMALAYA; from the Jumna to Assam and Eastern Bengal, ascending to 5000 ft. in Sikkim.

Stems 20-40 ft. by 1½-3 in. diam., graceful, naked below, straight, nodes not much raised often hairy, lower rooting; internodes 15-18 in., not shining, whiteringed below the nodes, thick-walled. Stem-sheaths 6-9 in., top roundly truncate, dorsally clothed with black hairs, base with a ring of soft deciduous hairs; blade of lower nodes and uppermost shoots 6-9 in., of middle nodes shorter, acute, black-hairy within, margins recurved, base rounded decurrent on the top of the sheath with large waved densely bristly auricles, bristles long curved. Leaves 6-12 by 1-1½ in., white beneath when dry, tip twisted scabrid, midrib and margins scabrid, nerves 7-10; sheath ending in a smooth callus and falcate auricle with long bristles. Infl. a stiff panicle with spiciform branches. Lodicules 3, long-fimbriate.—Difficult to distinguish from B. Tuldu without flowers, except by the rhizome. B. Falconeri, Munro, was founded on flower of B. nutans and leaves of Dendrocalamus Hamiltoni.

3. B. teres, Ham. ex Wall. Cat. n. 5026 B; stems cospitose, leaves large oblong-lanceolate tessellate by pellucid glands, spikelets 1-2 in. in bracteate heads neuter and fertile, 1-2 lowest gls. empty or gemmiparous ovate acute mucronate, flg. gls. 5-6 ovate-lanceolate from a broad base acute many-nerved tip sometimes foliaceous, palea ovate acute scaberulous 5-6-nerved between the toothed keels, anthers narrow tips penicillate. Munro in Trans. Linn. Soc. xxvi. (1868) 95; Gamble Bamb. Brit. Ind. 33, t. 31.

EASTERN BENGAL; Gongachora, Hamilton. ASSAM, Jenkins.

Stems 60 ft. by 3 in. diam., nodes ringed by the bases of fallen sheaths; internodes 20 in., walls $\frac{2}{\sqrt{3}-\frac{2}{3}}$ in. thick. Stem-sheaths 8-10 in. long and broad, hardly narrowed upwards, top rounded, nearly glabrous; blade 4-6 in., triangular, cuspidate, base rounded and decurrent in broad wavy fringed aurioles, appressed-hairy beneath; ligule narrow, white-hairy. Leaves 12-14 by $1\frac{1}{4}-1\frac{3}{4}$ in., tip long-acuminate twisted scabrid, base unequally narrowed shortly pubescent beneath, nerves 10-16, pellucid glands many; sheath ending in a broad shining callus; ligule short. Infl. a large compound panicle with spiciform branches bearing fascicles of spikelets and chaffy bracts. Lodicules sub-obovate, fimbriate, many-nerved.

4. **B. Ridleyi,** Gamble Bamb. Brit. Ind. 34, t. 32; leaves 12-14 by $1\frac{1}{2}-2$ in. margins smooth, sheath exauricled, ligule deeply 2-lobed, spikelets 1-2 in. few in distant clusters 3-5-fid. many neuter, empty gls. 2-4 ovate acuminate, il. gls. ovate-lanceolate mucronate many-nerved, palea shorter oblong keels minutely ciliate near the 2-fid tip, anthers long narrow setosely apiculate.

SINGAPORE, at Bukit Timah, Ridley.

Leaves oblong-lanceolate, tip subulate scabrid with its margins recurved, scaberulous above, smooth beneath, nerves 10-12 pair, petiole broad; sheath appressed hairy, subcarinate, ending in a narrow callus, margins truncate at the ligule which has long stiffy ciliate lobes. Inf. on long spiciform leafy branches bearing very distant clusters of few spikelets. Rachilla short. Palea many-nerved between the keels. Lodicules 3, many-nerved, long-fimbriate.—Habit and stemsheaths unknown.

5. B. burmanica, Gamble Bamb. Brit. Ind. 35, t. 33; leaves of young plants 10-12 by $\frac{1}{3}$ -2 in. white-hairy on both surfaces of older smaller smooth above hairy beneath, ligule short, spikelets 1 in. or less in spiciform branches of a panicle each in the axil of a long narrow truncate bract, empty gls. 2 mucronate, flg. gls. 5-6 ovate acute many-nerved, palea elliptic-ovate keels ciliate, anthers narrow tips apiculate.

UPPER BURMA: Katha district, Oliver.

Stems 50-60 ft., 4 in. diam., dull green, nearly solid, internodes 12 in. with a ring of white hairs below the not much swollen nodes. Stem-sheaths green with yellow margins, rather broader than long, top rounded, sides with appressed golden hairs; blade broadly cordate, cuspidate, base dilated into large rounded fringed auricles; ligule short. Leaves oblong-lanceolate, base unequally narrowed or rounded, tip with a twisted scabrous point, pellucid glands many, nerves 5-8 pair; sheath reddish-brown, keeled, tip truncate with a small decidnous auricle and decidnous cilia; ligule short, denticulate. Infl. a panicle of spiciform branches; rachis wiry. Palea with overlapping margins and 4-5 nerves between the keels; rachilla short, thick. Lodicules 3, 5-6-nerved, ciliate. Ovary stipitate. Grain oblong, top hairy.—A large bandsome species.

- §§ Keels of palea eciliate.
- 6. B. polymorpha, Munro in Trans. Linn. Soc. xxvi. (1868) 98; leaves small linear at first hairy on both surfaces, ligule very short, spikelets about \(\frac{1}{2} \) in. few together in many bracteate fascicles born on the long spiciform branches of a large panicle, shining, each in the axil of a long bract, empty gls. 1-3 ovate acuminate, flg. 2-3 ovate mucronate manynerved, palea rather longer lanceolate, anthers obtuse or apiculate. Kurz For. Fl. Brit. Burm. ii. 553; Gamble Bamb. Brit. Ind. 36, t. 34. Bambusa cyanostachya, Kurz MS. in Herb. Kew.

EASTERN BENGAL, PEGU & MARTABAN, Brandis, &c.

Evergreen, tufted, sometimes deciduous; stems attaining 50-80 ft. by 3-6 in. diam., curving outward, young white-scurfy, nodes thickened; internodes 15-24 in. Stem-sheaths 6-7 in. by 12-14 broad, thick, dorsally densely white-pubeccent, narrowed upwards and curved; blade reniform, 3 in. long, plaited and long ciliate below, base rounded and dilating into a broad band lining the top of the sheath, auricles falcate, the whole fringed with bristles; ligule narrow, entire. Leaves 3-7 by \(\frac{1}{2}\)-\frac{1}{2}\) in., base rounded or narrowed, nerves 4-6 pairs; sheath compressed, hairy, ending in a callus and minute auricle with deciduous bristles. Spikelets often brownish, subpedicelled, enclosed in a long curved glabrous bract. Lodicules 3, suborbicular. Anthers purple. Grain \(\frac{1}{2}\) in., ovate, plano-convex, top hairy.

- †† Stem-sheaths with a very long or narrow or imperfect blade, auricles 0 or minute; keels of palea ciliate.
- 7. **B. pallida**, Munro in Trans. Linn. Soc. xxvi. (1868) 97; coespitose, blade of stem-sheaths very long auricles small, leaves linear-lanceolate glabrous above often white-hirsute beneath, spikelets 1-1½ in. fertile and neuter on the spiciform branches of a large panicle, 1 or 2 lowest gls. ovate acute empty, then one male or gemmiparous followed by 3-8 fig. and 3-5 imperfect, fig. gls. ovate acute many-nerved, palea much shorter acute, anther-tip 1-2-setose or naked, ovary narrowed into the hairy style. Gamble Bamb. Brit. Ind. 37, t. 35. B. critica, Kurz in Journ. As. Soc. Beng. xlii. (1873) ii. 250. Dendrocalamus criticus, Kurz For. Flor. Brit. Burm. ii. 559.

SIKKIM HIMALAYA, N. & E. BENGAL, the KHASIA HILLS, ASSAM, UPPER

BURMA & PEGU, alt. 5-6000 ft. (cult. in the plains below).

Stems graceful, 40-60 ft. by 2-3 in. diam., olive green; nodes not prominent; internodes 18-30 in., walls thin. Stem-sheaths 7-12 by about 10 in. broad, top straightly truncate, young more rounded, glabrous or hairy; blade up to 14 in., triangular, acuminate, sparsely hairy, margins and very small auricles bristly; ligule very narrow. Leaves 4 8 by \(\frac{1}{2}\)-\(\frac{1}{3}\) in., tip subulate scabrid twisted, nerves 4-6;

sheath glabrous, ending in a smooth callus and a rounded erect fringed auricle; ligule very short. Panicle very large, pale. Spikelets pale, sometimes curved; rachilla short, clavate; palea 3-5-nerved between the keels. Lodicules 3. Stigmas 3.—Very like B. Tulda, but distinguished by the stem-sheaths, smaller narrow leaves, and overy.

8. **B. affinis**, Munro in Trans. Linn. Soc. xxvi. (1868) 93; shrubby, blade of stem-sheaths small lanceolate, leaves lanceolate or oblong-lanceolate scabrid beneath tessellate by pellucid glands, sheath setose keeled, ligule broad, spikelets about 1 in. in small distant whorls on terminal leafy spikes or panicles 6-10-fid. coriaceous shining, fig. gls. acuminate very-many-nerved folded at the base, palea much narrower, ovary sub-obovoid. Kurz For. Fl. Brit. Burm. ii. 551; Gamble Bamb. Brit. Ind. 39, t. 36.

Forests of MARTABAN & BURMA E. of the Sittang river, Kurz, Brandis.

Stems 15-20 ft. by 1-11 in. diam., pale green or striped with white, appressed-pubescent; internodes 1-2 in., tubular, with black hairs below the slightly thickened nodes. Stem-sheaths 4-6 in. long and broad, green, later straw-colrd., glabrous or with patches of appressed hairs, top rounded; blade 1-2 in., longer in young shoots, usually recurved, appressed hairy within, base decurrent as a narrow terminal wing of the sheath; ligule narrow. Leaves 6-10 by 1-11, petiole rather long, points twisted scabrid, nerves 8-10; sheath ending in a short callus. Spiteless in small whorls; rachilla short, top bearded; palea 7-nerved between the keels, 4-nerved beyond them. Lodicales 3, many-nerved. Stigmas 3.

9. B. khasiana, Munro in Trans. Linn. Soc. xxvi. (1868) 97; stem solitary from a creeping rootstock, blade of stem-sheaths with large inflated wings above the contracted base, leaves lanceolate or oblong-lanceolate and sheaths glabrous, spikelets sterile (short) and fig. (long) $\frac{1}{10} - \frac{1}{10}$ in. in distant heads on the spiciform branches of a long panicle 1-4 lowest gls. empty or gemmiparous ovate mucronate strongly nerved, fig. gls. 2-3-fid. 11-13-nerved, tip hairy within, palea as long as the gl. or longer manynerved, anthers obtuse, ovary narrowed into the style. Gamble Bamb. Brit. Ind. 39, t. 37.

Stems 30-40 ft. by 1-1; in. diam., graceful, fistular, rather soft, dull olive green, young golden hairy; internodes 5-15 in. with a whitish ring below the not prominent nodes and bluish ring above them; walls $\frac{1}{10} - \frac{3}{10}$ in. Stemsheaths 5-6 by 4-5 in., tawnily hairy, straight top truncate; blade as long as the sheath or longer, cuspidately acuminate, auricles 0; ligule narrow. Leaves 4-9 by 1-1; in., pale, tip setaceous shaggy, nerves 6-8 obscure; sheath ending in a broad callus and

Khasia to the Munnepore Hills, alt. 1-4000 ft., J. D. H. & T. T., &c.

minute setose auricle; ligule elongate, truncate. Spikelets cylindric, at length flattened. Branches of panicle fistular. Lodicules short, broad, fimbriate. Stigmas 3.

9. B. MANA, Roxb. Fl. Ind. ii. 190; dwarf, shrubby, blade of stemsheaths linear, leaves small linear-lanceolate, spikelets \(\frac{1}{2}-\frac{1}{2}\) in. few clustered or solitary on the branches of short diffuse panicles, gls. 5 or more all fig. rarely the lowest empty ovate acute many-nerved, palea shorter than the gl. keels minutely ciliate at or near the ip only, anthers obtuse or subapiculate yellow, ovary obovoid. Wall. Cat. n. 5036; Munro in Trans. Linn. Soc. xxvi. (1868) 89; Kurx For. Fl. Burma, ii. 551; Ind. Forester, i. 339; Trim. Cat. Ceyl. Pl. 110; Gamble Bamb. Brit. Ind. 41, t. 38. B. caesia, Sieb. & Zucc. fid. Munro. B. glauca, Lodd. Cat.; Lindl. in Penny Cycl. iii.

(1835) 357. B. glaucescens, Sieb. Cat. fid. Munro. B. sterilis, Kurz in Miq. Ann. Bot. Lugd. Bat. ii. 285. B. viridi-glaucescens, Carr. in Rev. Hortic. 1869, 292. Arundinaria glaucescens, Beauv. Agrost. 144; Nees Agrost. Bras. 526; Kunth Enum. Pl. i. 426; Rupr. Bamb. 23, t. i. p. 3; Steud. Syn. Gram. 334; Miq. Fl. Ind. Bat. iii. 413; Munro l. c. 22. Ischurochloa floribunda, Büse in Miq. Fl. Jungh. 390; Fl. Ind. Bat. iii. 422. Ludolfia glaucescens, Willd. in Ges. Naturf. Fr. Berl. Mag. ii. (1808) 320. Panicum arborescens, Lamk. Encycl. iv. 749. Triglossum arundinaceum, Fisch. ex Room. & Sch. Syst. Veg. 846.

MALAYAN PENINSULA; Pahang, alt. 7000 ft., Wray (wild?). Cultivated in Ceylon (CP. n. 4022) and in many parts of India.—Native of China and Japan.

Stems 6-10 ft., ½-1 in. diam., densely tufted, hard, green then yellow, branched from the base; nodes thickened; internodes 8-15 in. Stem-sheaths 4-6 by 2-8 in. broad, stiff, glabrous, narrowed upwards, top rounded; blade 2-3 in., acuminate, decurrent on the sheath, ciliate, appressed-hairy or glabrous above; ligule narrow, entire. Leaves 2-4 by ½ in., distinct, tip subulate twisted, not tessellate, costa faint, nerves 8-6; sheath ending in a prominent callus, auricle fringed; ligule short. Spikelets straw-colrd.; rachilla flattened, glabrous; palea many-nerved. Lodicules linear. Style very short. Grain elliptic, furrowed, shortly beaked, top hairy.

- ** Spikelets ovate-lanceolate in dense heads, flattened.
- 10. B. Balcoo, Roxb. Fl. Ind. ii. 196; stem-sheaths dimorphic, leaves oblong-lanceolate base rounded, sheath hairy, heads of spikelets bracteate, spikelets $\frac{1}{3} \frac{1}{3}$ in. or more, empty gls. 0-2 ovate acute manynerved, fig. gls. 4-6 larger margins ciliate, palea as long as the gl. ovate acute keels long-ciliate, anthers glabrous connective produced, ovary broadly ovoid. Munro in Trans. Linn. Soc. xxvi. (1868) 100; Brandis For. Fl. Brit. Burm. 567; Gamble Bamb. Brit. Ind. 42, t. 39. B. capensis, Rupr. Bamb. 54, t. 13, f. 54; Steud. Syn. Gram. 330. B. Vasaria, Ham. ex Wall. Oat. n. 5025. Dendrocalamus Balcooa, Voigt Hort. Suburb. Calcutt. 718.

BENGAL, from the Gogra, eastwd. to BEHAR and ASSAM.

Stems 50-70 ft., 8-6 in. diam., cospitose, branched from the base, lower branches stiff leafiess; internodes 8-18 in. with a whitish ring below and a hairy one above the swollen nodes, walls thick. Stem-sheaths of two forms; lower short, broad, ciliate, top rounded; blade short triangular docurrent into short fringed auricles; upper 10-14 by 8-10 in., almost glabrous, ciliate, truncate, blade 6-8 by 3-4 in., closely hairy above, margins recurved, base rounded and decurrent as a narrow band; ligule broad toothed. Leaves 6-12 by 1-2 in., pellucidly tessellate with glands, tip twisted scabrid, margins scabrous-ciliate, nerves 7-11; sheath appressed, hairy, truncate above with a narrow callus, bristly or not; ligule broadly triangular, membranous. Panicle compound, rachis pubescent or scurfy, swollen above; palea obscurely nerved. Lodicules 3, ovate or obovate, fimbriate. Anthers glabrous, pointed. Stigmas 3, long.

- Sect. II. Arborescent or shrubby. Stems not spinous. Spikelets flattened; fig. gls. few or many. Lodicules 2-3.
- 10. B. VULGARIS, Schrad. in Wendl. Collect. ii. 26, t. 47; nodes with a hairy ring, leaves linear-lanceolate petioled glabrous tessellate by pellucid glands, sheath larly hairy, callus smooth, auricle ciliate, ligule short, spikelets $\frac{a_0}{10}$ in. in bracteate clusters of 3-10 oblong acute bifid, empty gls. 1-2 ovate acute many-nerved tip ciliate, fig. gls. 6-10 larger, palea is long as the gl. keels white-ciliate, anthers obtuse hairy apiculate purple, ovary narrow hairy, style long. Roth Nov. Sp. 198 (excl. Syn.

R. & S.); Ruprecht in Mem. Acad. Petersb. Ser. VI. v. (1839) 140, Bamb. 47, t. 11, f. 47; Steud. Syn. Gram. 329; Dalz. & Gibs. Bomb. Fl. 299; Munro in Trans. Linn. Soc. xxvi. (1868) 106; Beddome Fl. Sylv., Forest. Man. p. cexxxii.; Brandis For. Flor. 568; Kurz For. Fl. Brit. Burm. ii. 551, Ind. Forester, i. 339; Mig. Fl. Ind. Bat. iii. 417; Griseb, Fl. Brit, W. Ind. 528; Rivière, Les Bambous, 191, f. 18, 19; Trim. Cat. Ceyl. Pl. 110; Gamble Bamb. Brit. Ind. 44, t. 40. B. arundinacea, Ait. Hort. Kew Ed. II. 316; Moon Cat. Ceyl. Pl. 26 (non Willd). B. humilis, Reichb. fid. Rupr. l. c. 50. B. Sieberi, Griseb. l. c. 5. B. striata, Lodd ex Munro l. c. 121; Bot. Mag. t. 6079. B. surinamensis, Rupr. l. c. 49, t. 11, f. 49; Steud. l. c. 329. B. Thouarsii, Runth in Journ. de Phys. (1822) 148; Rev. Gram. i. 323, t. 73, 74, Enum. Pl. i. 431, Suppl. 356; Rupr. Bamb. 48, t. 11, f. 48; Steud. l. c. 329; Nees in Linnæa, 466; Thwaites Enum. Pl. Ceyl. 375. Nastus Thouarsii, Spreng. Syst. ii. 113.

Cultivated throughout tropical INDIA and in all hot countries. (Wild in Java,

Stems 20-50 ft., by 2-4 in. diam., rather distant, green yellow or striped, polished; nodes hardly raised, with usually a ring of brown hairs; internodes 10-18 in., walls rather thin. Stem-sheaths 6-10 in. by 7-9 in. broad, often streaked with yellow, thickly hairy above, top rounded retuse; blade 2-6 by 4 in., appressed hairy on both surfaces, base rounded decurrent with rounded falcate fimbriate auricles; ligule broad, toothed or fimbriate. Leaves 6-10 by 3-13 in., pale, petioled, tip twisted scabrid, nerves 6-8; sheath loosely hairy, callus ciliate, auricle rounded; ligule short, ciliate. Panicle large, leafy, clusters of spikelets largest at the nodes, rachis scurfy. Lodicules 3, winged, ciliate.

11. B. Oliveriana, Gamble Bamb. Brit. Ind. 130, t. 116; stems cospitose, leaves small linear thin, auricles unequal, panicle of drooping unilateral spikes with distant bracteate clusters of 1-3 flattened spikelets about \(\frac{1}{2} \) in. long, empty gls. 1-2 ovate-lanceolate, fig. gls. 3-4 9-nerved, rachilla long flattened, palea as long as the gl. acute tip penicillate keels glabrous, anthers obtuse, ovary elongate ovoid, style short, stigmas 2.

UPPER BURMA, Oliver, Rogers.

Stems graceful, 40-45 ft., 1-2 in. diam.; glossy green, branching from the base, internodes about 14 in. Stam-sheaths thin, pale, 8-10 in. by 4-5 broad, narrowed upwards to a mouth 2-3 in. broad, glabrous; blade 4-8 in., triangularlanceolate, cordate, sparsely hairy on both surfaces; auricles unequal long fringed, one 10-3 in. rounded, the other decurrent; ligule 10 in. broad, serrate. Leaves 4-7 by 1-1 in., petioled, glabrous, nerves 4-5 pair; sheath glabrous, callus emarginate; ligule rather long. Bracts of infl. truncate, glabrous. Palea 3-nerved between and on either side of the keels. Lodicules 3, rounded, fimbriate. Grain ovoid. Anthers striped red and yellow, then purple.

12. B. Binghami, Gamble Bamb. Brit. Ind. 45, t. 41; stems wiry, leaves linear or linear-lanceolate base rounded tip long twisted glabrous, panicle terminal short leafy, spikelets few in scattered fascicles about \(\frac{1}{2} \) in. long, empty gls. 1-2 striate mucronate, flg. gls. 5-6 ovate acute mucronate smooth many-nerved, palea as long as the gl. or longer keels fringed with long hairs, anthers obtuse or with an apical hair, ovary elongate, style short.

LOWER BURMA: Tenasserim. Bingham.

Leaves 3-6 by 1-2 in., subsessile or petiole very short, smooth on both surfaces. nerves 5-6 pairs. Panicle with short rachis; joints sometimes geniculate clavate. Spikelets with distichous gla., rachilla evident broad clavate flexuous; palea conspicuous. Lodicules rounded, long-ciliate. Grain linear-oblong, beak hairy .-Appears not to differ very greatly from the Chinese B. flexuosa, Munro.

13. **B. Ringiana**, Gamble Bamb. Brit. Ind. 46, t. 42; leaves linear-lanceolate tessellate by pellucid glands base unequally rounded, petiole flat, sheath smooth, ligule broad toothed or timbriate, spikelets \(\frac{1}{2} \) in. few in regularly spaced clusters ovate flattened, empty gls. 2 ovate acute margins ciliate, fl. gls. 4-6 similar but larger, palea oblong keels long-ciliate, anthers penicillate, ovary stipitate broadly ovoid, style short stout.

UPPER BURMA; Katha district, Oliver.

Stems 60-70 ft., up to 4 in. diam. Leaves 10-12 by 1-2\frac{1}{2} in., tip scabrid, at first sparsely hairy beneath, nerves 10-15 pairs; petiole \frac{1}{2}-\frac{1}{2} in.; sheath smooth, margins ciliate, callus broad shining, auricle small naked; ligule unequal-sided. Panicle large, compound, rachis of spiciform branchlets flexuous, joints flattened on one side, bracts small. Spikelets purplish, rachilla clavate flattened. Lodicules 3, long-fimbriate. Stigmas 3.—Habit of a Dendrocalamus. Stem-sheaths not known.

Sect. III. Shrubby, not spinous. Spikelets ovate, flattened, many-fld., long-mucronate. Lodicules 0.

14. B. lineata, Munro in Trans. Linn. Soc. xxvi. (1868) 118; stems reed-like, leaves large stiff brittle ovate- to linear-lanceolate, ligule short stiffly fimbriate, infl. of spikes or panicles terminating leafy branchlets and bearing bracteate clusters of often spirally twisted spikelets about \$\frac{1}{2}\$ in, bracts large, empty gis. 1-2 ovate long acuminate 5-7-nerved, fig. longer white-ciliate, palea narrow keels minutely ciliate, anther-tips penicillate, ovary oblong pubescent. Gamble Bamb. Brit. Ind. 46, t. 43. B. Rumphiana. Kurz in Journ. As. Soc. Beng. xxxix. (1870) 86, Ind. Forester, i. 341. B. Amahussana. B. atra, B. picta, B. prava. Lindl. in Penny Cyclop. iii. (1835) 357. Leleba Rumphiana, Kurz in Cat. Hort. Bogor. (1866) 20. L. lineata, Rumph. Herb. Amb. vi. 5, t. 1.

Andaman Islds., Prain, in marshy coast forests.—Distrib. Malay Archipelago. Stems short, always flowering, \(\frac{1}{2}\)-1 in. diam., green or striped with yellow, young much branched, sparsely bristly; nodes ringed by the bases of the fallen sheaths; internodes 16-24 in., rough. Stem-sheaths about 6 by 3-4 in., truncate, young strigose with golden hairs; blade usually as long as the sheath, ovate, cuspidate, erect, many-nerved, base rounded then dilating into a hairy long ciliate band on the sheath. Leaves very variable, up to 15 by 3 in. on the shoots, shorter on the branches, dull green, pale beneath, tessellate by pellucid glands, tips and margins scabrid, nerves 8-12; sheath hairy, keeled, truncate, callus minute or 0; auricles long, falcate, bristly, deciduous; ligule stiffly fimbriate. Spikelets sessile; bracts truncate; rachilla short, glabrous. Stigmas 3.—A very remarkable species with Bromus-like spikelets. Kurz ennmerates 5 varieties in the "Indiau Forester."

(B. atra is its earliest name.—J. D. H.)

- Sect. IV. Arborescent, not spinous. Spikelets cylindric, few-fid. Lodicules 0-3.
- 15. B. schizostachyoides, Kurz ex Gamble Bamb. Brit. Ind. 48, t. 44; leaves lanceolate to linear-lanceolate, sheath at first hispid truncate, callus 0, auricle falcate bearing long twisted stiff bristles, ligule long, panicle terminal spiciform, spikelets about \(\frac{1}{2} \) in. few in bracteate clusters, empty gls. 1-2 ovate mucronate many-nerved, fig. gls. 2-3 longer rough above, palea narrow keels ciliate, anthers long-apiculate, ovary elliptic-oblong, style long. Cephalostachyum schizostachyoides, Kurz For. Fl. Burm. 565. Melocanna? Kurzii, Munro in Trans. Linn. Soc. xxvi. (1868) 134. Teinostachyum schizostachyoides, Kurz in Journ. As. Soc. Beng. xxxix. (1870) ii. 89.

SOUTH ANDAMAN ISLDS., Kurz.

Stems tufted, 20-30 ft. by 3-4 in. diam., green, glossy, nodes not thickened; internodes 11-2 ft., walls thin; branches 1-4 from each node, leafy below, flowering above. Leaves 4-7 by \ -1\frac{1}{2} iv., tip twisted scabrous, glabrous and pale beneath. nerves 5-6. Bracis of infl., narrow, truncate or acuminate, smooth, rachis pubescent, joints about 1 in. Palea membranous, acuminate, dorsally 3-nerved. Lodicules if present lanceolate, ciliate. Anthers purple, cells unequal. Ovary narrowed into the style. Grain obliquely oblong, smooth, beak long stiff.—Stem-sheaths not known. Remarkable for the narrow membranous acuminate palea.

Sect. V. Subscandent, not spinous. Spikelets cylindric. fl. gl. solitary.

16. B. Griffithiana, Munro in Trans. Linn. Soc. xxvi. (1868) 99; leaves large lanceolate glaucous beneath base unequal cuneate tessellate by pellucid glands, sheath glabrous keeled callus narrow, auricles falcate reflexed strongly bristly, ligule elongate ciliate, spikelets about & in. in distant heads on a hollow soft rachis ovate-lanceolate acute, empty gls. 2 ovate acute many-nerved, fig. gl. larger mucronate, palea membranous acute keels glabrous, anthers obtuse tip 2-fid, ovary ovoid glabrous. Gamble Bamb. Brit. Ind. 49, t. 45. Dendrocalamus Griffithianus, Kurz For. Fl. Brit. Burm. ii. 562.—Bambusa, Griff. Journ. 90.

UPPER BURMA; banks of Mogaung River, Griffith.

Stems soft, slender, hollow. Leaves 1-1; by 2-3 in., tip subulate, twisted, scabrid, nerves 13-17, petiole & in., stout; auricles of sheath up to § in., bristles long; ligule obtuse or triangular, often cleft. Panicle terminal, of spiciform branches bearing heads at intervals of 1-4 in. Spikelets cylindric; fig. gl. convolute; rachilla glabrous, clavate, much shorter than its imperfect terminal gl.; palea many-nerved. Lodicules 3. long-fimbriate, one much smaller. Style very short, stigmas long, plumose.

17. B. Wrayi, Stapf in Kew Bulletin, 1893, 14, in Hook. Ic. Pl. t. 2253; stems decurved, leaves linear-lanceolate narrowly acuminate, auricles of sheath small, ligule short truncate bristles long, panicle large leafy, spikelets in short bracteate spikes, within each bract is a keeled bracteole, then 2 imperfect spikelets in the axils of lanceolate glabrous gls. each subtended by a 2-keeled ciliate scale, fertile spikelet with ovate-lanceolate acute many-nerved, gls. keels of palea rough or faintly-ciliate, anthors obtuse glabrous, ovary ovoid glabrous. Gamble Bamb. Brit. Ind. 50, t. 46.

MALAY PENINSULA; Perak, alt. 4500-5500 ft., Wrav.

Stems 40-60 ft., 1 in. diam., semiscandent, tips decurved to the ground, yellow, glabrous, shining, 3rd or 4th lower internodes up to 7 ft. Leaves 8-10 by 1 iu. glabrous, petiole short narrow, nerves 7-8; sheath pale, glabrous, callus shining; hairs of ligule up to } in. Panicle large, leafy, clusters of spikelets at the nodes or in spiciform branches, rachis smooth. Empty gl. convolute, rachilla as long as its imperfect terminal gl. Lodicules narrow, minutely ciliate. Ovary narrowed into a very short style, stigmas long, plumose. Grain oblong, beak cylindric.

Sect. VI. Arborescent, spinous.

18. B. Blumeana, Schult. f. Syst. vii. 1343; stem-sheaths short. leaves fascicled linear-lanceolate sheath appressed hairy, ligule fimbriate, clusters of many imperfect and few perfect spikelets, perfect spikelets 1-13 in. slender compressed, empty gls. 2-3 ovate acute 3-7-nerved, fig. gl. ovate acuminate 7-8-nerved, palea broad obtuse concave keels ciliate, anthers obtuse, ovary ovoid, style very short. Kunth Enum. Pl. i. 431; Munro in Trans. Linn. Soc. xxvi. (1868) 101; Kurz Ind. Forester, i. 340; Gamble Bamb. Brit. Ind. 50, t. 47. B. spinosa, Blume ex Nees in Bot. Zeit. (1825) 580. Ischurochloa spinosa. Büse in Mig. Pl. Jungh. 389. Schizostachvum Durie, Rupr. Bamb. 46.

MALAY PENINSULA; Pahang, Ridley .- DISTRIB. Malay Islds.

Stems 80-60 ft. or more, 8-4 in. diam., hard, smooth, glossy, nodes not prominent, walls thick; branches many, yellowish, copiously armed; spines short ternate, recurved. Stem-sheaths 5-6 by 3-4 in, broad, narrowed to a broad convex mouth, thick, coriaceous, hispid with stiff tawny bristles, young striped violet-brown and yellow; blade nearly as broad as the sheath, triangular, cuspidate, convolute, sides covered with tawny bristles, decurrent as a broad band ending in a rounded auricle, both lined with long stiff bent bristles; ligule narrow, toothed, long-fimbriate. Leaves 3-6 by 1-1 in., glabrous, base rounded, tip twisted scabrous, glaucous beneath, nerves 5-7; sheath appressed hairy, callus recurved ciliate, mouth sparsely bristly; ligule truncate, fimbriate. Paniels large, terminal, branches spiciform. Lodicules 3, long-ciliate. Grain obovoid, shining above, tipped with the three stigmas.

19. B. arundinacea, Willd. Sp. Pl. 245; stem-sheaths long blade with felted hairs within, leaves linear or linear-lanceolate glabrous or slightly pubescent beneath, ligule short, spikelets 1-1 in. sessile lanceolate acute, empty gls. 0-2 ovate-lanceolate acute or mucronate many-nerved, fl. gls. 3-7 like the empty lower bisexual upper male with 2 or 3 uppermost imperfect, keels of palea ciliate, anthers yellow obtuse, ovary ellipticoblong style short. Retz. Obs. v. 24 (Bambos); Roxb. Cor. Pl. i. 56, t. 79, Fl. Ind. ii. 191; Poir. Encycl. viii. 701; Kunth Enum. Pl. i. 431; Rupr. Bamb. 51, t. 13, f. 50; Grah, Cat. Bomb. Pl. 239; Dalz. & Gibs. Bomb Fl. 299; Munro in Trans. Linn. Soc. xxvi. (1868) 103; Brand. For. Fl. 564; Beddome Fl. Sylv. t. ccxxi., Forest. Man. p. ccxxxi.; Kurz For. Fl. Brit. Burm. ii. 554; Thw. Enum. Pl. Zeyl. 375; Trim. Cat. Ceyl. Pl. 110; Wall, Cat. n. 5023 A; Duthie Fodd. Grass. N. Ind. 70; Gamble Bamb. Brit. Ind. 51, t. 48. B. Arundo, Klein ex Nees in Linnæa, ix. (1834) 471; Rupr. Bamb. 53, t. 13, f. 53; Wight ex Steud. Nom. Ed. II. i. 183. B. Neesiana, Arn. ex Munro l. c. B. orientalis, Nees l. c. 475; Rupr. l. c. 52, t. 13, f. 51; Munro l. c. 105; Beddome l. c. p. ccxxxi. B. pungens, Blanco Fl. Filip. Ed. I. 270. B. spinosa, Roxb. Fl. Ind. ii. 198; Ham. in Trans. Linn. Soc. xiii. (1822) 480; Wall. Cat. n. 5024; Nees l.c.; Rupr. l. c. 52, t. 12, f. 52, t. 13, f. 52; Munro l. c. 104; Beddome l. c.; Brandis l. c. 566; Steud. Syn. Gram. 329; Benth. Fl. Hongk. 434. Arundo Bambos, Linn. Sp. Pl. 81. 'Ily,' Rheede Hort. Malab. i. t. 16.

Throughout the Plains and low hills of INDIA and CEYLON, wild and cultivated. (Cultivated only in the lower Himalaya and in the valleys of the Ganges and Indus.) Stems from a stout rootstock, 80-100 ft. and 6-7 in. diam., graceful and curving (or short and thickly branched), branched from the base; nodes prominent, lower with long horizontal shoots armed with 2-3 recurved spines; internodes up to 18 in., often subangular, the smaller flattened on one side, walls 1-2 in. thick. Stemsheaths 12-15 by 9-12 in., coriaceous, young orange-yellow often striped green or red, top rounded, edges plaited, young thickly clothed with golden hairs; blade triangular, up to 4 in., acuminate, concave, glabrous without, matted within with dark bristles; margins involute, decurrent on the sheath, wavy, long and thickly ciliate, hardly auricled; ligule narrow, entire, or fringed with white hairs. Leaves up to 8 by 1 in., tip sharp stiff, base rounded ciliate, subtessellate by pellucid glands; sheath glabrous or nearly so, callus thick ciliate, auricle short. Panicle enormous, often occupying the whole stem; rachis usually stiff, shining, sometimes soft and angular. Lodicules 3, small, fimbriate. Anthers sometimes apiculate.—Flowers gregariously and in small clumps. The following species of most authors are here united. The two first scarcely differ, the last seems more nearly a separate species and the remarkable rachis justifies its admission as a variety.—Further B. arundinacea shows two distinct varieties of habit, a tall handsome large stemmed one of the valleys of the Circars and hills of S. India (often cult. elsewhere); and an almost dwarf gregarious thick brauched very thorny small-stemmed one 20 ft. high (probably Roxburgh's B. spinosa) which grows gregariously in the low hills and

laterite downs of Orissa, Ganjam, Lower Bengal and Burma.

B. ARUNDINACEA: rachis of infl. very glabrous shining hard, spikelets few long

6-12-fid., rachilla evident hirsute, leaves smooth, sheath hairy.

B. SPINOSA, rachis striute hard not shining, spikelets many shorter 4-6-fid., rachilla obscure, leaves glabrous above hairy beneath, sheath hairy, then subglabrous.

B. ORIENTALIS; rachis glaucous green angled almost soft, spikelets membranous

5-8-fid., leaf-sheath hairy with white cilia, petiole hairy.

- B. Speries of which the flowers are unknown.
- 20. B. auriculata, Kurz in Journ. As. Soc. Beng. xxxix. (1870) 86; cospitose, stem-sheaths strigose on the back, leaves lanceolate tessellate by pellucid glands, sheath smooth polished, auricle naked shining. Gamble Bamb. Brit. Ind. 55, t. 49. Gigantochloa auriculata, Kurz For. Fl. Brit. Burm. ii. 557.

ASSAM, SYLHET, CHITTAGONG & BURMA, Mann, Kurz, &c. Evergreen. Stems 40-50 ft., 2-2\frac{1}{2} in. diam., glossy, old yellow, young scurfy, branches decurved, nodes hardly thickened; internodes 18-30 in., lower shorter, walls thick. Stem-sheaths 10-12 in. by 9-10 in., base broad, convexly truncate where 4 in. broad; blade 6-9 in., triangular, acute, base slightly rounded decurrent and forming a rounded auricle; blade and sheath densely strigose except along the middle; ligule sharply toothed. Leaves 8-16 by 1-2\frac{1}{2} in., petiole \frac{1}{10}-\frac{1}{2} in., point twisted scabrid, nerves 8-12, shining; callus of sheath smooth; auricle thick, rounded, glossy.—Referred by Munro to B. vulgaris, but very distinct, and easily recognizable by the two hairy patches on the stem-sheath, and the thin blade.

21. **21. 2**

MARTABAN & UPPER TENASSERIM, on limestone hills, Brandis.

Stems about 3 in. diam., nodes hardly raised, internodes 12-15 in. Leaves 5-8 by \(\frac{1}{2}\)-\(\frac{3}{2}\) in., tip cuspidate setaceous twisted scabrid, nerves 6-12 inconspicuous; sheath minutely villous, then glabrescent, margins whitish-ciliate; ligule short.

22. B. Mastersii, Munro in Trans. Linn. Soc. xxvi. (1868) 113; stem scandent reed-like, leaves oblong-lanceolate narrowed into a glandular (wrinkled?) often hairy petiole tessellate by oblique pellucid glands, tip beaked acuminate hairy, callus of sheath narrow, auricles with long stiff folded bristles. Gamble Bamb. Brit. Ind. 56.

Assam; at Dibrugarh, Masters.

Leaves 10-13 by about 1½ in., base yellowish, glaucescent beneath, costa yellowish shining, nerves 10-12 pairs; sheath striate, margins ciliate, sides appressed-bristly; ligule very short.

23. 23. marginata, Munro in Trans. Linn. Soc. xxvi. (1868) 114; stems tall scandent dark-colrd. fistular, branches deflexed, branchlets bracteate geniculate, lower internodes hirsute, leaves oblong-lanceolate margins towards the setaceously acuminate tip shaggy with thick silky

hairs, callus ciliate, ligule truncate toothed hairy outside. Gamble Bamb. Brit. Ind. 57.

TENASSERIM; top of Daunat range, alt. 5000 ft., Brandis.

Leaves 6-7 by 1-11 in., glabrous, base rounded, petiole 10-1 in., costa vellowish, nerves 4-7 pairs, pellucid glands few; sheath striate, keeled, glabrous.—Perhaps a Dinochlou.

UNDETERMINABLE SPECIES.

B. ARISTATA, Lodd. ex Lindl. in Penny Cyclop. iii. 357.

135. THYRSOSTACHYS, Gamble.

Arborescent erect bamboos. Stem-sheaths elongate, thin, persistent; blade long, narrow. Leaves small or moderate sized. Panicle compound. Spikelets prominently bracteate, loose, pale, 2-3-fid., upper gl. fertile, terminal rudimentary on a produced rachilla; empty gls. 1-2, striate; fig. similar; palea of lower gl. 2-cleft, lobes caudiform, keels ciliate, of upper entire, elongate, not sceled; rachilla hairy. Lodicules 0-3, long-acuminate. Stamens 6, anthers mucronate. Ovary depressed-turbinate, style long, stigmas 2-3 feathery. Grain cylindric, long-beaked, glabrous, top shining, side grooved; pericarp crustaceous, adherent to the seed.

1. **T. Oliveri**, Gamble Bamb. Brit. Ind. 58, t. 50; stem-sheaths transversely truncate not auricled blade, long subulate, leaves long linear-lanceolate, panicle thyrsoid curved, spikelets ½-1 in., empty gls. 2 ovate acute sparsely hairy many-nerved, nerves trabeculate, fig. gls. similar, palea 3-5-nerved hairy between the keels.

UPPER BURMA, alt. 2000 ft., in moist forests, Oliver; Shan Hills, Abdul Huk. Cospitose. Stems straight from a stout rootstock, 50-80 ft. by 1-2½ in. diam., bright green, young silkily-downy old dull green or yellowish, nodes thickened; internodes 16-24 in., walls rather thin. Stem-sheaths persistent, shorter than the internodes, green to orange and brown, dorsally thickly pubescent, margins ciliate, not auricled; blade 8-9 by ¾ in., recurred, hairy above; ligule serrate. Leaves 7-8 by ½-¾ in., roughish, base rounded, hairy beneath, nerves 6 pairs, pellucid glands irregular; sheath hairy, keeled; callus glabrous or hairy. Thyrsus bracteate at the nodes; rachis flexuous, hairy, top swollen; bracts ½-¾ in., narrow, obtuse, sometimes foliiferous. Spikelets long and short, rachilla hairy. Lodicules 2, lanceolate, ciliate. Filaments purple, anthers yellow, connective obtuse. Ovary depressed turbinate, pedicelled, yellow, stigmas 3.

2. T. siamensis, Gamble Bamb. Brit. Ind. 59, t. 51; deciduous, stem-sheaths waved and truncate at top, auricles short triangular, bladenarrowly triangular, leaves small narrow linear, panicle large, spikelets pedicelled fertile and sterile mixed, empty gl. solitary ovate acute 8-nerved base white-pubescent, fig. gls. 3 larger uppermost alone fruiting base and tip pubescent 14-16-nerved. Bambusa regia, Thoms. ex Munro in Trans. Linn. Soc. xxvi. (1868) 116 (non Kurz). B. siamensis, Kurz mss.

BURMA, from Mandalay to Tenasserim, Brandis, Oliver .- DISTRIB. Siam.

Stems cospitose, very graceful, 25-30 ft., 1\(\frac{1}{2}\)-3 in. diam., branching towards the top only, branches after flowering often producing small-leaved tufts of wiry branchlets; nodes not prominent; internodes 8-11 in., with a white ring below the nodes. Stem-sheaths very persistent, 9-11 by 4\(\frac{1}{2}\)-8 in., thin, soft, white-pubescent; blade

4-5 in., margins recurved; ligule narrow, glabrous, ciliate. Leaves 3-6 by \(\frac{1}{2} \) in., glabrous or young puberulous, tips short twisted, costa narrow, nerves 3-5 pairs; sheath white pubescent and ciliate, truncate, callus glabrous; ligule short, ciliate. Panicle graceful, pale; branchlets many, thin, bearing bracteate clusters of few fertile spikelets mixed with sterile; bracts cymbiform, glabrous, tip truncate; rachis fine, wiry, curved, smooth, clavate. Spikelets whitish. Palea of upper fl. gl. longer than the gl., not keeled, concave, striate, glabrous, 2-mucronate, narrowed into a beak. Lodicules 0. Ovary at first ovoid, then depressed, flattened; style glabrous.

136. GIGANTOCHLOA, Kurz.

Arborescent or scandent. Stems unbranched below. Stem-sheaths usually stiff, hairy above, auricled. Leaves long. Panicle compound, branches long spiciform, bearing heads of few usually fertile and sterile spikelets. Empty gls. 2-3; fi. gls. similar. Palea of all the fi. 2-keeled, keels ciliate. Lodicules 1-3 or 0. Stamens 6, filaments connate into a short thick at length elongate membranous tube. Ovary hairy, stigmas 1-3 hairy. Grain usually oblong or linear and furrowed, pericarp membranous. Species about 11, chiefly Malayan.

- * Spikelets oblong or ovoid, rounded, or flattened in G. Scortechinii.
- 1. G. verticillata, Munro in Trans. Linn. Soc. xxvi. (1868) 124; spikelets 2-4-fid. $\frac{3}{10}$ in. ovate subacute glabrous, empty gls. 2-3 broadly ovate ciliolate, fig. gls. 3-4 similar many-nerved mucronate. Gamble Bamb. Brit. Ind. 61, t. 52. G. maxima, Kurz in Tidschr. Ned. Ind. xxvii. (1864) 226, Ind. Forester, i. 343. Bambusa verticillata, Willd. Sp. Pl. ii. 245. B. pseudarundinacea, Steud. Syn. Gram. 330.

MALAY PENINSULA, wild and cultivated .- DISTRIB. Malay Archipelago.

Stems tufted, 80-100 ft., 4-5 in. diam., young striped yellow, mealy and with appressed brown deciduous bristles; old gray-green; nodes hairy, not prominent; internodes 18 in., walls rather thin. Stem-sheaths 12 in. long, as broad or broader, rounded to the mouth with rounded ciliate anricles, clothed without with golden brown hairs, glabrous and shining within; blade short, recurved, ovate, acuminate, narrowly decurrent; ligule narrow. Leaves 10-15 by 1½-2½, base narrowed, top setaceous twisted scabrid, young hairy beneath, nerves 8-12; sheath truncate, young hairy, callus narrow, auricle short glabrous; ligule minute. Rachis and branch-lets glabrous, smooth, slender. Palea of fig. gl. shorter than the gl. sometimes 2-mucronate, 3-5-nerved, ciliate on and between the keels. Lodicules variable. Anthers yellow. Ovary suborbicular, very hairy; style pubescent, stigmas 2-3.

2. **G. Scortechinii**, Gamble Bamb. Brit. Ind. 62, t. 53; spikelets trimorphous larger fertile, medium rigid, small sterile, fertile spikelet $\frac{7}{0}$ — $\frac{9}{10}$ in. ovate acute flattened densely clothed with silvery grey hairs, empty gls. 2-3 ovate mucronate, fl. gls. longer.

MALAY PENINSULA, Scortechini, &c., alt. 400-600 ft.

Gregarious, forming forests. Stems 40-80 ft., 4-6 in. diam. Leaves linear-lanceolate, 12-16 by 1-11 in., often unequal sided, base narrowed, tip acuminate twisted scabrid, softly hairy beneath, tessellate by pellucid glands; sheath densely pubescent, callus pubescent; auricle small, rounded, fringed with bristles; ligule short, hairy. Panicle compound, of curved spiciform branchlets bearing whorls of distichous heads 1-2 in. apart. Spikelets 2-5 fertile in each head mixed with sterile, rachis pubescent; uppermost fig. gl. convolute; palea shorter than the gl., 6-nerved

between the 2 ciliate keels, top 2-fid. Lodicules 0. Anthers vellow, long-apiculate. Ovary rounded, style glabrous. Grain obtuse, glabrous.

- ** Spikelets narrow, cylindric, acute.
- + Leaf-liquite short.
- 3. G. macrostachya, Kurz For. Fl. Burm. ii. 557; nodes hairy, leaves lanceolate whitish and softly puberulous beneath, spikelets 1-2 in. linear-subulate, gls. fringed with black hairs, empty gls. 2-3 ovate mucronate dorsally many-nerved with a few bristles, fig. gls. 2-3 longer linear-lanceolate convolute, palea very narrow keels white-ciliate dorsally 3-5-nerved. Gamble Bamb. Brit. Ind. 63, t. 54.

ASSAM; Garrow Hills, Mann. CHITTAGONG, ARRACAN, & BURMA, Kurz, &c. Evergreen. Stems 30-50 ft., 21-4 in. diam., fistular, young glaucous, old dark green, sometimes striped; nodes scarcely thickened; internodes 16-30 in., lower shorter, walls \(\frac{a}{10} - \frac{1}{10}\) in. thick. Stem-sheaths 5-8 in. long, up to 14 broad, top truncate, densely covered with blackish hairs; blade as long or shorter, reniform, acute, appressed hairy beneath, base rounded dilated into a long-fringed hand 1-1 in. broad with rounded auricles; ligule narrow. Leares thin, lanceolate, 6-15 by \ 2 in. tip setaceous scabrid, margins scabrous, midrib narrow, nerves 5-13; sheath hairy, at length glabrous; callus rounded, suricles 1 or 2 ciliate; ligule short. Panicle large, leafy, branchlets spicate; spikelets 1-2 in., clustered, fertile and sterile. Lodicules O. Anthers purple, tips setaceous. Ovary ellipsoid, style long curved hairy, stigma undivided. Grain linear, puberulous above.—The leaves resemble Bamb. Tulda; the sheaths B. nutans and teres; the spikelets Oxytenanthera nigro-ciliatu.

4. G. Wrayi. Gamble Bamb. Brit. Ind. 64. t. 55; branchlets scurfy glaucous, leaves large oblong-lanceolate cuspidate shortly petioled strigose beneath, spikelets ? in. conical acute, gls. fringed with black hairs, empty gls. 2-3 ovate mucronate striate, fig. gls. 3-4 longer narrower, palea narrowly oblanceolate keels faintly ciliate 5-7-nerved.

MALAYA; Perak, at Bukit Gantang, L. Wray.

Stems 3 in. diam. Leaves 12-15 by 2-21 in., tip setaceous, scabrous, midrib broad yellow, nerves 10-12 pairs, nervules of pellucid glands; sheath smooth, keeled, mouth and short auricle fringed with long stiff white bristles, callus narrow; ligule short, puberulous. Panicle compound, branchlets spiciform, fertile spikelets few, sterile shortly bracteate, rachis curved. Spikelets subcompressed; empty gls. 2-3, fig. gls. narrower. Lodicules 0. Anthers long, narrow, tips elongate setaceous hairy. Ovary hairy, style slender pubescent, stigma broadly plumose.

5. G. Kurzii, Gamble Bamb. Brit. Ind. 65, t. 56; leaves linearlanceolate base cuneate petioled sparsely hairy beneath, spikelets & in. acute, gls. fringed with brown hairs, empty gls. 2-3 ovate mucronate many-nerved, fig. gls. 2-3 longer narrower terminal imperfect, palea linear obtuse 3-5-nerved keels ciliate.

TENASSERIM, Kurz. PERAK, Ridley.

Stem-sheaths 6 by 3 in., cylindric, truncate, glabrous; blade longer, recurved, lanceolate, decurrent in a narrow black band lining the top of the sheath, ending in a naked round auricle. Leaves 8-13 by 1-11 in., petiole 1 in., midrib narrow, nerves 9-11 pairs; young sheath appressed hairy, truncate, auricles rounded; ligule short. Panicle leafy, branchlets spicate. Spikelets 2-3 in. in heads with narrow bracts. Anthers obtuse, apiculate. Ovary stipitate, puberulous, style long, stigma plumose. Grain (young) glabrous.

6. **G. heterostachya**, Munro in Trans. Linn. Soc. xxvi. (1868) 125; subscandent, leaves linear-lanceolate base rounded shortly petioled tip setaceous twisted scabrous sparsely hairy on the midrib beneath, spikelets dimorphic sterile $\frac{1}{2}$ — $\frac{3}{2}$ in., fig. 1-1 $\frac{1}{4}$ in. oblong compressed, empty gls. 1-3 ovate glabrous, fig. gls. 4-5 with 1-2 imperfect convolute, palea short obtuse 4-8-nerved keels ciliate. Kurz Ind. Forester, i. 345; Gamble Bamb. Brit. Ind. 66, t. 57. Bambusa hetirostachya, Munro in Herb. Trin. Coll. Dublin, fide Munro l. c. 126.

MALAY PENINSULA; near Ayer Punas, about houses, Griffith.

Stems 30 ft., graceful, thin-walled. Leaves 4-11 by \(\frac{1}{2}\)-1 in., midrib narrow shining, nerves 6-8; sheath striate, auricle and callus rounded glabrous; ligule long, toothed, sometimes long-ciliate. Panicle large, leafy, branches spiciform, heads of spikelets \(\frac{1}{2}\)-4 in. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. spikelets sometimes sometimey glabrous bracts, rachis smooth, upper joints puberulous; fig. spikelets sometimes of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. spikelets sometimes of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. spikelets sometimes of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. apart,

7. G. ligulata, Gamble Bumb. Brit. Ind. 67, t. 58; leaves large oblong-lanceolate base wrinkled unequal narrowed into a flat petiole, tip acuminate with reflexed margins scabrous, ligule long 2-fid, spikelets $\frac{1}{2} - \frac{3}{4}$ in., conical acuminate, gls. ciliate with brown hairs, empty gls. 2-4 ovate acute mucronate many-nerved, flg. gls. longer, palea short 5-nerved keels long-ciliate.

MALAY PENINSULA; Perak, Wray; Pahang, Ridley.

Leaves 12-16 by 2-3 in., beneath pule and smooth except the scabrid tip, midrib broad yellow beneath, nerves 12-14 pairs, cross-nervules of pellucid glands; sheaths smooth, shining, brown, striate; callus rounded, shining, often ciliate; ligule up to 1 in., glabrous, lobes long-acuminate, membranous. Panicle terminal, long, of spiciform branchlets bearing distant heads on leafy branches, each with 5-8 fertile spikelets in the axils of long yellow glabrous bracts \(\frac{1}{2}-1\frac{1}{2}\) in. long, mouth of bracts truncate, furnished with round dark naked auricles and long fimbriate ligules, rachis fistular, glaucous, lower joints 3 in. Lodicules 0. Anthers long-apiculate, tip hairy. Ovary long-stipitate, depressed ovoid, shining, hairy, style slender, stigms short plumose.

8. G. latispiculata, Gamble Bamb. Brit. Ind. 67, t. 59; leaves broadly lanceolate petioled base cuneate glabrous except the scabrid tips, ligule broad cleft, spikelets over 1 in., nearly glabrous, empty gls. 2-3, lower foliiferous ovate-lanceolate mucronate, fl. gls. 7-9 ovate-lanceolate long-acuminate hairy within margins faintly ciliate, palea shorter obtuse 7-nerved keels ciliate.

MALACCA, Alwis.

Stems 50 ft. Leaves 12-14 by 1-1½ in., pale, midrib prominent shining, nerves 8-9 pairs obscure; sheath smooth, glabrous, keeled, callus narrow. Paniele terminal, of spiciform branchlets bearing distinct heads 1-3 in. apart, of 1-4 very large flattened spikelets ½-½ in. broad, rachis smooth striate; bracts very small. Lodicules small, obovate, 3-5-nerved, fimbriate. Anthers narrow, tips apiculate, penicillate. Ovary narrowly ovoid, pubescent, style slender, stigmas 3 plumose.

137. OXYTENANTHERA, Munro.

Arborescent or scandent unarmed Bamboos, with a stout usually creeping and stoloniferous rootstock. Stem-sheaths various. Leaves large or small, shortly petioled. Panicle large, branches with few or many heads of whorled or capitate spikelets. Spikelets elongate, cylindric or

conical, 1-3-fid., terminal fi. usually fertile; empty gls. 1-3; fi. gls. elongate, flucronate. Palea of lower fis. 2-keeled, of uppermost convolute keel 0 or obscure. Lodicules 0. Stamens as in Gigantochloa. Ovary ovoid, style slender, stigmas 1-3 more or less plumose. Grain elongate, beaked, smooth.—Species the following and a tropical African.

- * Heads usually of few spikelets. (Burmese and Malay species.)
- 1. O. nigrociliata, Munro in Trans. Linn. Soc. xxvi. (1868) 228; auricles of stem-sheaths naked, spikelets 1 in., gls. fringed with black or purple cilia many-nerved, empty gls. 2-3 ovate acute and mucronate, flg. gls. 2-3 and a terminal imperfect lanceolate acuminate long mucronate, palea narrow 2-3-nerved between the ciliate keels, anther tips elongate slender hirsute. Beddome Fl. Sylvat., Forest. Man. p. ccxxxii.; Gamble Bamb. Brit. Ind. 69, t. 60. Bambusa nigrociliata, Bise in Pl. Jungh. i. 389; Miquel Fl. Ind. Bat. iii. 416. B. Bitung, Hassk. Pl. Jav. Rar. 42. B. gracilis, Wall. Cat. n. 5033. Gigantochloa nigro-ciliata, Kurz Ind. Forest. i. 345. G. andamanica, Kurz For. Fl. Burma, ii. 566.

ORISSA, CHITTAGONG, BURMA, the MALAY PENINSULA, and the ANDAMAN ISLDS. PGARROW HILLS.—DISTRIB. Sumatra, Java.

Stem 30-40 ft. by ½-2 in. diam., sometimes striped with yellow, internodes scabrous. Stem-sheaths about 6 in., margins ciliate, narrowed to the truncate tip, dorsally strigose; blade ovate-lanceolate, decurrent; auricle bright green, rounded, naked, hairy within; ligule narrow. Leaves 6-12 by 1-2 in., lanceolate, tip subulate twisted, base unequal and rounded or narrowed, scaberulous above, pale and at first pubescent beneath, midrib promiuent, nerves 9-12, glands like nervules; sheath stiff, hairy at first only, margins ciliate, auricles rounded naked; ligule narrow. Panicle large, compressed; rachis of bran hes pubescent. Spikelet in distant whorls of 3-6. Anthers ½-½ in., narrow, purple. Ovary pubescent. Grain linear-oblong, dorsally grooved, beak penicillate.

2. O. albo-ciliata, Munro in Trans. Linn. Soc. xxvi. (1868) 129; spikelets $\frac{n}{10}$ — $\frac{n}{10}$ in., often curved mixed with yellow chaffy white-ciliate bracts fertile and a few sterile together, gls. white-ciliate, empty gls. 1-2 ovate acute, flg. gls. elliptic acute or faintly notched many-nerved convolute 2-3 lowest male, upper 1 or 2 bisexual, authers with long hiraute tips. Gamble Bamb. Brit. Ind. 70, t. 61. Gigantochloa albo-ciliata, Kurz For. Fl. Burma, ii. 555.

Throughout BURMA, Falconer, &c.

Stems 20-30 ft. by \(\frac{1}{2}\)-1 in. diam., densely tufted, greyish-green, curved, nodes raised; internodes 6-15 in., hispid above, walls \(\frac{1}{2}\)-\(\frac{1}{2}\) in. thick. Stem-sheaths 4-9 by 6 in., tawnily strigose, then glabrous, base coriaceous folded, mouth narrow ending in a slightly auricled nuked band; blade lanceolate, base rounded and decurrent; ligule \(\frac{1}{2}\)-1 in., toothed. Leaves 6-8 by \(\frac{3}{4}\)-1 in., linear-lanceolate, tip setaceous, base rounded, shortly petioled, glabrous on both surfaces, nerves 6-9, pellucid glands like nervules; sheath smooth, striate, truncate, callus smooth; ligule rather long. Panicle large, spreading; branches smooth, slender, with distant whorls of 10-20 spikelets. Ovary acuminate, pubescent. Grain oblong, acuminate.

3. **O. sinuata**, Gamble Bamb. Brit. Ind. 71, t. 62; leaves large softly pubescent beneath, panicle-branches softly tomentose, spikelets sterile and fertile mixed, $\frac{3}{10}$, $\frac{4}{10}$ in. in small heads conical puberulous, gls. ciliate many-nerved, empty gls. 2-3 ovate mucronate, fl. gls. 2-3 longer fertile uppermost convolute, lower paleæ 2-3-nerved between the ciliate keels, tip of narrow anthers slender hairy.

MALAYA; Sunjei Ulong. Johore, Ridley (var. with glabrous spikelets).

Leaves 10-12 by 1½-1½ in., oblong-lanceolate, acuminate, base rounded or subcordate, petiole broad hairy, tip setaceous scabrid twisted scaberulous above, midrib faint, nerves 10-12 pair; sheath glabrous or puberulous, keeled, striate, ending in a narrow ciliate callus; ligule rather short, thickly pubescent. Panicle with slender sinuous branches, internodes ½-1½ in. Ovary broadly ovoid, style hairy, stigma plumose.

4. O. parvifolia, Brandis ex Gamble Bamb. Brit. Ind. 72, t. 63; leaves 3-5 by ½ in. linear-lanceolate puberulous beneath, spikelets narrow 3-½ in. 4-10 in a whorl with polished bracts, rachis slender wiry, gls. eciliate fertile and sterile mixed, empty gls. 2-3 ovate mucronate glabrous, fl. gls. similar but longer usually 2 fertile and 1 imperfect, palea 2-3-nerved between the shortly ciliate keels, anthers short obtuse.

BURMA; in the Yônzalin Valley, Brandis.

Stems up to 3 in. diam. Stem-sheaths 8-9 by 8-10 in., strigose with brown hairs, top truncate striate; blade 2-3 by 1 in, base rounded and decurrent in a narrow naked subauricled band; ligule long, rather broad. Leaves shortly petioled, base rounded, tip subulate twisted, pale and puberulous beneath; sheath at first hairy, ending in a prominent callus bristly at the top. Panicle of long glabrous branches, with internodes 1-2 in. Spikelets glabrous; empty gls. striate towards the tip. Ovary hairy, style long slender, stigmas 1-2 plumose.

- ** Heads of many spikelets.—South Indian species.
- 5. O. Thwaitesii, Munro in Trans. Linn. Soc. xxvi. (1868) 129; stem reed-like straggling, leaves up to 8-12 by 1-1½ in., spikelets ½-½ in. in dense heads with ovate bracts acute pale usually 1-fid., rachis smooth, gls. with more or less ciliate margins, empty gls. 2-3 ovate mucronate many-nerved, fig. gl. ovate acute cuspidate pubescent over, palea convolute, anther-tips long hairy, stigmas 3. Beddome Fl. Sylv. t. cccxxii.; Forest Man. p. ccxxxii.; Trim. Cat. Ceyl. Pl. 110; Gamble Banb. Brit. Ind. 73, t. 64. Dendrocalamus monadelphus, Thwaites Enum. Pl. Ceyl. 376.

NILGHIEI and TRAVANCORE HILLS, alt. 3500-6000 ft. CEYLON, alt. 4-6000 ft. Stems 10-12 ft. by 1 in. diam., gregarious, straggling or subscandent, smooth; branches whip-like, branchets whorled and sheathed, nodes prominent, internodes 12-18 in. rough, young hirsute, walls \(\frac{1}{10-\frac{1}{10}}\) in. thick. Stem-sheaths about 6 by 3-4 in., of young shoots glabrous yellow shining, of old strigose with light brown hairs, ending in a corisceous separable ciliate ring; blade 3-5 by 1 in., base rounded decurrent in rounded falcate auricles, pectinately ciliate with long curved bristles; ligule of old sheaths long-fimbriate, of young nerrow erose. Leaves with twisted setaceous tips, sparsely hairy beneath, midrib narrow yellow, nerves 4-5 pairs, pellucid glands few; sheath often hirsute keeled, callus rounded, young with falcate bristly auricles; ligule long. Panicle very large, leafy; lower heads 1\(\frac{1}{2}\)-2 in. diam., upper smaller with fewer spikelets. Ovary ovoid and style pubescent. Grais \(\frac{1}{2}\)-1 in., glabrous, mucronate.—Easily recognized by the whip-like climbing branches and long-ciliate sheaths.

6. O. monostigma, Beddome Fl. Sylv. Forest. Man. p. coxxxiii., and Ic. Pl. Ind. Or. i. 56, t. 234; stem solid velvety-tomentose pale yellow, leaves 6-8 by 1½ in. linear-lanceolate, spikelets ½-1 in. in globose heads fertile and sterile spinescent, glabrous, empty gls. mucronate 2-3 lower small ovate, upper ovate-lanceolate, fig. long linear-lanceolate long-mucronate convolute, palea concave not keeled obtuse, anthers tipped with a long hairy bristle, stigma 1. Gamble Bamb. Brit. Ind. 74, t. 65. Bambusa Ritcheyi,

Munro in Trans. Linn. Soc. xxvi. (1868) 113. Schizostachyum hindostanicum, Kurz in Journ. Beng. As. Soc. xlii. (1873) II. 252

WESTERN GHATS, from the Concan to the Anamalai Hills.

Stems 10-15 ft. or more by 1 in. diam., internodes long. Stem-sheaths 6-9 by 3 in. broad at the base, narrowed from the base up to the 2-lobed tip; blade in the sinus, 3 in., linear-lanceolate; ligule long, fimbriate. Leaves variable, shortly petioled, pale green, tip setaceous twisted, base unequal rounded, sparsely hairy beneath, midrib beneath yellow shining, nerves 7-12; sheaths striate; ligule long. Panicle large, terminal, rachis smooth, heads of spikelets up to 2½ in. diam. Ovary ovoid, acuminate and style glabrous, stigma thickened. Grain narrow, tipped with the conic style-base.

7. O. Stocksii, Munro in Trans. Linn. Soc. xxvi. (1868) 130; stems ; labrous or softly pubescent, leaves 4-8 by \(\frac{1}{2}\)-\frac{2}{3} in., spikelets \(\frac{1}{2}\) in. in globose heads spinescent glabrous fertile and sterile, empty gls. 2 ovate mucronate 5-7-nerved, fl. gls. 2 ovate subacute dorsally mucronate, anthers short acute, stigma 1. Beddome Fl. Sylvat., Forest. Man. p. ccxxxiii.; Gamble Bamb. Brit. Ind. 75, t. 66.

The CONCAN, Stocks, &c. (usually cultivated).

Stems slender, grey-green, solid, or tube slender, nodes with a softly pubescent ring; internodes 6-12 in. Stem-sheaths 6-9 in. by 3-7 at the base, tapering upwards to a retuse tip, densely brown, strigose, margins ciliate; blade subulate, base dilated into a rounded fringed auricle; ligule \(\frac{1}{2}\) in., deeply fimbriate. Leaves very shortly petioled, tip setaceous, base rounded or cuneate, beneath glabrous or hairy, midrib narrow, nerves 5-6; sheath striate; ligule rather long, toothed. Panicle large; heads 1 in. diam., mixed with chaffy bracts, rachis smooth, internodes 1-2 in. Anthers short, acute. Ovary and long style hairy, stigma simple, plumose.

8. O. Bourdilloni, Gamble Bamb. Brit. Ind. 76, t. 67; stem-sheaths coriaceous nearly glabrous, leaves 6-9 by 1-1½ in., mouth of leaf-sheath with 2 shining calli, spikelets $\frac{2}{3}-\frac{3}{4}$ in. in globose heads glabrous, rachis soft, empty gls. 2 ovate mucronate many-nerved, fl. gls. 3, mucronate lowest much longer than the next, rachilla ciliate and bearing a setaceous gl., anthers apiculate, stigmas 3, short.

TRAVANCORE; on the Ghats, alt. 3-4000 ft., Bourdillon.

Stem in open clumps of straggling habit, soft, internodes long. Stem-sheaths 6-12 by often 6 in., glabrous, except a few black bristles below, slightly narrowed upwards, tip truncate; blads 2-3 in., triangular, decurrent and forming two rounded recurved entire wings that line the upper edge of the sheath; ligule short. Leaves shortly petioled, thin, tip twisted, scabrous covered above with scabrid papille near the margins and midrib, smooth beneath; midrib narrow, nerves 7-8; sheath soft, striate; ligule long, serrate. Panicle large spikelets in globose heads 1½-2 in. diam., rachis fistular. Palea of lower fis. 3-nerved between the ciliate keels, rachilla ciliate with a terminal imperfect gl. Ovary and style hairy. Grain linear-obloug, tipped with the thickened style-base.

138. DEMDROCALAMUS, Ness.

Arborescent unarmed Bamboos, with densely branching rootstocks. Leaves shortly petioled, transverse nervules represented by pellucid glands. Spikelets in globose clusters on the long branches of a compound panicle, ovate, 2-6-fid.; empty gls. 2-3, ovate, acute, many-nerved; fig. gls. like the empty; palea of lower fis. keeled, of upper dorsally rounded eciliate. Lodicules 0 or rare. Stamens 6, filaments free. Ovary hairy above, often

depressed, stigma usually simple. Grain small, pericarp coriaceous or crustaceous.—Species 16 known.

Sect. I. Spikelets hard, spinescent, crowded in spicate heads.—Leaves usually narrow.

1. D. strictus, Nees in Linnæa, ix. (1834) 476; leaves up to 10 by 1½ in., shortly suddenly petioled softly hairy beneath, spikelets ½ in. hairy spinescent fertile and smaller sterile mixed, empty gls. 2 or more ovate spinescent many-nerved, flg. gls. ovate tip spinescent and pubescent, palea of lower 6-7-nerved between the ciliate keels, anthers apiculate. Miq. Fl. Ind. Bat. iii. 421; Munro in Trans. Linn. Soc. xxvi. (1868) 147; Beddome Fl. Sylvat. t. cccxxv., Forest. Man. p. ccxxxv.; Brandis For. Fl. 569, t. 70; Kurz For. Flor. Burma, ii. 558, Ind. Forester, i. 346; Aitchis. Cat. Panjab. Pl. 171; Duthie Fodd. Grass. N. Ind. 71; Gamble Bamb. Brit. Ind. 78, t. 68, 69. Bambos stricta. Roxb. Corom. Pl. i. 58, t. 80. Bambusa stricta, Roxb. Fl. Ind. ii. 193; Kunth in Journ. Phys. xlv. (1822) 148; Enum. Pl. i. 431; Ruprecht Bamb. 56, t. 12, f. 56; Steud. Syn. Gram. 330; Dalz. & Gibs. Bomb. Fl. 299. B. verticillata, Rottl. ex Munro l. c. B. pubescens, Lodd. ex Lindl. in Penny Cyclop. iii. (1835) 357. B. Tanæa, Ham. ex Wall. Cat. n. 5038 A.—Bambusa, Wall. Cat. n. 5038.

Dry hills of N. India, from Garwhal to Nepal and southward from the Panjab to Behab, the Concan, Central and S. India, Buema, and Great Cocos Isld.

(Not in Ceylon.)—DISTRIB. Java.

Stems 20-50 ft. by 1-3 in. diam., hollow in moist climates, solid in dry, young glaucous green, old yellowish, nodes swollen, lower often rooting, internodes 12-18 in., upper branches decurved. Stem-sheaths variable, lower 3-12 in., glabrous or strigose with yellow-brown hairs, striate, top rounded ciliate, slightly suricled; blade triangular, hairy, especially within; ligule narrow. Leaves deciduous, narrowed from the rounded petioled base to the twisted tip, midrib prominent, nerves 3-6 pairs with interposed pellucid glands; sheath striate hairy, callus prominent, auricle short ciliate with flexuous deciduous hairs; ligule narrow, serrate. Panicle large, heads dense, 1-1\frac{1}{2} in., much smaller in S. Indian forms; rachis smooth, internodes 1\frac{1}{2}-2 in. Spikelets usually hairy. Ovary stipitate, turbinate, style long, stigms simple feathery. Grain broadly ovoid, shining, beaked, hairy above.

Var. Prainiana, Gamble l. c. 80, t. 69, fig. A.; spikelets smaller, fis. fewer, fi.

gls. nearly glabrous. Great Cocos Isld., Prain.

2. **D. sericeus**, Munro in Trans. Linn. Soc. xxvi. (1868) 148; characters of D. strictus, but spikelets silkily hairy, anther-tips obtuse. Gamble Bamb. Brit. Ind. 81, t. 70.

BEHAR, summit of Parus-nath, alt. 4000 ft., J. D. H., &c.

(I should regard this as a variety of *D. strictus* had it not been retained by Munro & Gamble. The latter describes the empty gls. as obtuse, but they are acute in the plate referred to.—J. D. H.)

3. **D. membranaceus**, Munro in Trans. Linn. Soc. xxvi. (1868) 149; stems scurfy when young, leaves 5-10 by $\frac{1}{2}-\frac{3}{4}$ in. hispid above, spikelets $\frac{1}{3}$ in., glossy nearly glabrous, empty gls. 2 ovate obtuse or acute, fl. gls. 2-3 ovate mucronate glabrous margins often ciliate, anthers apiculate. Kurz For. Fl. Burma, ii. 560; Gamble Bamb. Brit. Ind. 81, t. 71.

EASTERN BURMA, Wallich, &c.

Closely resembles glabrous forms of D. strictu., but stem-sheaths with waved hairy auricles, leaves thinner, base less rounded, grain more elongate, and grooved.

- Sect. II. Spikelets in large soft congested heads. Leaves usually broad.
- 4. D. sikkimensis, Gamble in Hook. Ic. Pl. t. 1770, Bamb. Brit. Ind. 82, t. 72; stem sheaths felted with golden brown hairs, leaves 6-10 by 1½-2 in. oblong-lanceolate strigosely hirsute and rough beneath, mouth of leaf-sheaths fringed, spikelets ½-3 in. in large globose red-brown heads lanceolate subobtuse glabrous, empty gls. 3-4 ovate keeled keels ciliate, fig. gls. 2-3 ovate mucronate glabrous margins ciliate, anthers acute. Gard. Chron. (1890), i. 792, fig. 130, II. 279 (1892), ii. 675 cum Ic.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 4-6000 ft. GARROW HILLS, on Tura Peak, alt. 3500 ft.

Stem 50-60 tt. by 5-7 in. diam., naked below, dark green, nodes ringed, internodes 18 in., rough. Stem-sheaths 12 by 15 in., top broad; blade lanceolate, recurved, hairy on both surfaces, decurrent into two large falcate recurved auricles fringed with long curved pale bristles; ligule sharply serrate. Leaves variable, tip black twisted, base rounded, smooth above, midrib prominent, nerves about 10 pairs; sheath smooth, callus small ciliate, auricles fringed with stiff bristles; ligule short, fimbriate. Panicle large, branches nodose, heads of spikelets 1½ in. diam., rachis dull brown puberulous, internodes about 2 in. Palea of lower fl. obtuse, keels shaggy many-nerved. Ovary subglobose, hairy; style short, thick, and clavate stigma hairy. Grain depressed obovoid, spiculate, wrinkled below.

5. **D. Hookeri,** Munro in Trans. Linn. Soc. xxvi. (1868) 151; stemsheaths felted with black or brown hairs, leaves 10-12 by 2 in. or more oblong-lanceolate rough beneath, mouth of leaf-sheath not fringed, spikelets about $\frac{1}{3}$ in. in large heads ovate acute puberulous, empty gls. 2 ovate obtuse, fig. gls. 2-3 ovate acute many-nerved uppermost mucronate, authors long tips penicillate. Brandis For. Flor. 570; Gamble Bamb. Brit. Ind. 84, t. 73. Bambusa globifera, Griseb. in Goett. Nachr. (1868), 72.

SIRKIM HIMALAYA, Anderson, &c. Assam, the Khasia, Jaintea, and Duphla Hills, alt. 2-5000 ft., J. D. H. & T. T., &c. Burma; Bhumo district, Oliver.

Stem 50-60 ft. by 4-6 in. diam., naked below, internodes 18-20 in., lower somewhat rough and hairy, walls about 1 in. thick; branches long, curving. Stemsheaths large, old very broad, younger about 16 in. by 8-12 broad at the base, top 2-3 in. broad; suricles 2, rounded, ciliate with stiff hairs; blade 3-7 in., triangular, hairy above; ligule 1-1 in., sharply serrate. Leaves oblong-lanceolate, tip long twisted hispid, base rounded very shortly petioled, midrib very prominent yellow, nerves 8-16 pairs, tessellate by pellucid glands (seen when dry); sheath hairy below, shining above, truncate, sometimes spariogly hairy, callus large; ligule conspicuous, glabrous. Pawicle large, internodes 2-3 in., dull grey-green, somewhat hirsute; heads of spikelets 1 in. diam.; fl. gls. with transverse nervules. Ovary ovoid, acuminate, hairy, style twisted, stigma plumose.

6. D. Hamiltonii, Nees & Arn. ex Munro in Trans. Linn. Soc. xxvi. (1868) 151; stem-sheaths glabrous, leaves broadly lanceolate cuspidate, spikelets nearly \(\frac{1}{2} \) in. long ovoid depressed purple glabrous, empty gls. usually 2 short rounded nerved, flg. gls. 2-4 orbicular margins ciliate, anthers purple with a long black hairy twisted point. Brandis For. Fl. 570. Bambusa monogyna, Griff. Notul. 63, Ic. Pl. Asiat. t. 2. B. maxima, Ham. ex Wall. Cat. n. 5039. B. Falconeri, Munro l. c. 95, in part.

TROPICAL HIMALAYA; from Garwhal (cult.?) to Sikkim, Assam, the KHASIA HILLS, and SILHBT.

Stems up to 80 ft. by 4-7 in. diam., much branched above, young appressedly white-pubescent, nodes with root-scars; internodes 12-20 in., walls \(\frac{1}{2} \) in. thick.

Stem-sheaths glabrous or with patches of appressed hairs, tip truncate, auricles acute; blade lanceolate, acute, with a small glabrous triangular point on each side, often 12 in., glabrous, margin incurved, with black bristles at the base within; ligule \(\frac{1}{2} \) in., smooth, entire. Leaves variable, small on side branches, up to 15 by $2\frac{1}{2}$ in in new shoots, base rounded shortly petioled, tips scabrous twisted, margin finely serrate, midrib very narrow, nerves 6-17 pairs with nervules of pellucid glands; sheaths glabrous above, below clothed with white appressed stiff hairs, subkeeled below the shining callus; ligule broad. Panicle very large, branches scabrous and white-pruinose, furrowed on one side; internodes 1 in. or less, thick, fistular, scabrid; heads hemispheric, $\frac{1}{2}$ in. diam.; spikelets usually all fertile, surrounded with rounded scarious bracts. Ovary subglobose, hairy, style long, stigma 3-fid feathery. Grais broadly ovoid, beaked, glabrous or hairy above.

7. **D. patellaris**, Gamble Bamb. Brit. Ind. 86, t. 75; stem-sheaths long cylindric margins above with a broad membranous fimbriate wing, leaves 8-16 by 1-4 in. lanceolate base narrow, spikelets depressed-ovoid obtuse, gls. all orbicular cuspidate many-nerved and palea tomentose within, empty gls. 1-2 membranous, fig. 3-5, anthers purple tip conical hairy. Bambusa patellaris, Kurz in Herb. Calcutt.

SIKKIM HIMALAYA; below Tonglo, alt. 4000 ft., Anderson, &c. NAGA HILLS, Mann.

Stems 20-30 ft. by 1-1½ in. diam., dull green, striate, nodes with a hairy belt, internodes 12-18 in., walls thin. Stem-sheaths very persistent, 10-12 in. by 3 in. broad, sparsely strigose, glabrous within, narrowed in upper third to a truncate top, margins winged for 1-2 in.; limb 6 in., lanceolate; ligule tringed. Leaves persistent, petioled, variable, soft, tip twisted scabrid, midrib stout, nerves 8-10 pairs; sheath striate, keeled, truncate, or produced into a narrow callus, margins fringed; ligule very large, fimbriate. Panicle very large, rachis of branches rough, flatular; heads distant, distinchous, ½-1 in. diam., bearing bard shining bracts. Spikelets many, dark brown, rachilla produced with a terminal imperfect gl. Lodicules 0 or 2, narrow, long-ciliate. Ovary ovoid, style hairy, stigmas 3.

Sect. III. Spikelets few, in small heads, many sterile.

* Spikelets long, ovate, acute.

8. D. giganteus, Munro in Trans. Linn. Soc. xxvi. (1868) 150; stem-sheaths very large nearly glabrous, leaves up to 20 by 4 in. oblong young hairy beneath, spikelets 1 in. ovoid acute spinescent puberulous, empty gls. ovate mucronate striate, fl. gls. 3-6 thin mucronate many-nerved, anthers acuminate. Kurz Ind. Forester, i. 346; Gamble Bamb. Brit. Ind. 88, t. 76. Bambusa gigantea, Wall. Cat. Bot. Gard. Calc. 79; Voigt Hort. Suburb. Calc. 719.

Tenasserim, the Malay Peninsula, and Penang (cult. in Assam and elsewhere in India).

Stems 80-100 ft. by 8-10 in. diam., branched above, nodes hairy, internodes rather short, grey-green, young with waxy scurf, walls thin. Stem-sheaths 20 in., as broad at the base, deciduous, thinly strigose with golden hairs, top depressed; blade 5-15 by 3½ in., decurrent into glabrous stiff brown wavy auricles, narrowed above into a short point; ligule 2-5 in., stiff, black, margin serrate. Leaves cuspidately acuminate, tips twisted, young hairy beneath, midrib strong, nerves 12-16 pairs, with pellucid cross bars. Panicle very large, branchlets slender curved; heads up to 1 in. diam. ½-1 in. apart. Spikelets sometimes all flowering, rachilla produced with an imperfect gl. Ovary ovoid and long style hairy, stigma simple. Grain oblong, obtuse, hairy above.

9. D. calostachyus, Kurz For. Fl. Burma, ii. 562; stem-sheaths truncate tawny-strigose, leaves 9-12 by 1-2½ in. broadly lanceolate softly hairy beneath, spikelets about ½ in. ovate acute faintly pubescent, empty gls. 2-3 broadly ovate acute many-nerved; fig. gls. 4-6 rather longer, anthers yellow mucro smooth. Gamble Bamb. Brit. Ind. 89, t. 77. Bambusa calostachya, Kurz in Journ. Beng. As. Soc. xlii. (1873) 249.

UPPER BURMA; Bhamo and Kachin Hills up to 3500 ft., J. Anderson.

Stems with appressed silvery hairs; nodes thickened, annulate. Stem-sheaths truncate; ligule narrow, subentire. Leaves shortly petioled, base rounded, nerves 9-13 pairs, sheaths white-ciliate, mouth truncate, callus small; ligule broad, truncate. Panicle of long whip-like curved spikes; rachis flattened on alternate sides, glaucous, subpuberulous; heads of 2-5 spikelets; bracts few small. Spikelets subcompressed; fig. gls. with conspicuous transverse nervules; palea 5-nerved and transversely nervuled between the ciliate keels and 1-nerved outside the keels. Ovary broadly ovoid, subhemispheric and long style hairy, stigms simple fringed.

10. **D. latiflorus**, Munro in Trans. Linn. Soc. xxvi. (1868) 152, t. 6; leaves 7-10 by 1-2 in. broadly lanceolate long-acuminate, spikelets $\frac{1}{2} - \frac{3}{4}$ in. few in a head ovate-oblong compressed, gls. many-nerved pubescent, empty gls. 2 short broad acute ciliate, fl. gls. 6-8 broadly ovate suddenly narrowed to a subobtuse point, margins dark colrd. ciliate, anthers pale tipped by a hairy mucro. Gamble Bamb. Brit. Ind. 131, t. 117. Bambusa latiflora, Kurz in Journ. As. Soc. Beng. xlii. (1873) II. 250. B. verticillata, Benth. Fl. Hongk. (ex Munro).

UPPER BURMA; Southern Shan States, King's Collector.—DISTRIB. China, Formoss.

A very large Bamboo. Stems tall, fistular, internodes short, 5 in. diam., cavity large, striate, glabrous. Leaves shortly petioled, glabrous, midrib prominent, nerves 9 pairs, transverse nervules many obscure; sheath sulcate, glabrous or hairy between the lines, ligule truncate. Panicle large, uppermost spikelets followed by leaf-like bracts 1-1½ in. long, rachis softly hairy, flattened on one side, white-ringed above. Ovary ovoid from a broad base and long style hairy, stigmas 1-2.

- ** Spikelets short, obtuse.
- 11. **D. longispathus**, Kurz For. Fl. Burma, ii. 561; stem-sheaths persistent papery strigose with patches of brown hair, leaves oblong- to linear-lanceolate narrowed to the base rough almost white beneath, spikelets $\frac{1}{6}$ — $\frac{1}{6}$ in. in small heads obtuse nearly glabrous, empty gls. 2–3 obovate obtuse, flg. gls. 2–3 obovate cucullate margins ciliate many-nerved, anthers short tip mucronate black. Gamble Bamb. Brit. Ind. 89, t. 78. Bambusa longispatha, Kurz in Beng. As. Soc. Journ. xlii. (1873) II. 249.

SILHET, Mann. CHITTAGONG, Lister, Sc. ARRACAN, Schlich. BURMA, Brandis, &c.

- Stems 60 ft., leafy above only, nodes often rooting; internodes 10-24 in. by 8-4 diam., grey-green, walls \(\frac{1}{2} \) in. thick. Stem-sheaths fragile, 15-20 by 5-7 in., sides parallel till near the depressed sometimes 1-auricled top; blade 12-18 in., lanceolate, dorsally hairy; ligule broad, serrate and often fimbriate. Leaves acuminate midrib thick yellow, nerves 8-10 pairs; sheath smooth, glabrous; ligule narrow. Panicle large, sometimes leafy, of interruptedly spicate clusters \(\frac{1}{2} \) \(\frac{3}{2} \) in. broad, with hard polished bracts at the base. Spikelets few or many-fid. Ovary broadly ovoid, subacute; style rather short, stigma short. Grain ovoid, yellow, beaked.
- 12. D. Brandisii, Kurz For. Fl. Burma, ii. 560; stem-sheaths thickly coriaceous white-pubescent, leaves 9-12 by 1-2 in. oblong-lanceolate softly

hairy beneath, spikelets $\frac{1}{6}-\frac{1}{3}$ in. depressed ovate puberulous, empty gis. 1-2 broadly ovate mucronate, fig. gls. 2-4 similar few-nerved margins ciliate hairy below the tip, anthers short apiculate or penicillate greenish-yellow. Gamble Bamb. Brit. Ind. 90, t. 79. Bambusa Braudisii, Munro in Trans. Linn. Soc. xxvi. (1868) 209.

BURMA; Pegu, Martaban Hills, and Ruby-mines district, Kurz, &c.

Stems 60-100 ft. by 5-8 in. diam., tufted; nodes slightly swollen, internodes ashy-grey, 12-15 in., walls thick. Stem-sheaths up to 2 ft. by 12-14 in., top depressed; blade 6-18 in., linear-lanceolate, strigose within, decurrent in small plaited auricles; ligule \(\frac{1}{2}\) \(\frac{1}{3}\) in., lacerate. Leares base narrowed, petiole wrinkled, midrib stout shining, nerves 10-12 with transverse pellucid glands; young sheaths pubescent, mouth with a few long cilia, callus large, glabrous. Panicle large, branches whip-like, rachis densely pubescent flattened on one side, internodes 1-1\frac{1}{2}\) in.; heads \(\frac{1}{2}\)-\frac{2}{3}\) in. diam., bracteate; palea with 3-nerved side wings. Lodicules 1, 2, or 0, 3-nerved, long-ciliate. Filaments short. Ocary ellipsoid, hairy, style short, stigmas 2 plumose. Grain ovoid, mucronate, hairy above.—Perhaps not different specifically from D. flagellifer.

13. **D. flagellifer,** Munro in Trans. Linn. Soc. xxvi. (1868) 150; very near D. Brandisii, but leaf-base more rounded, rachis of spikes more hairy, heads with fewer spikelets. Gamble Bamb. Brit. Ind. 91, t. 80. Bambusa flagellifera, Griff. mss. ? B. Bitung, Schult. Syst. vii. II. 1354.

TRNASSERIM; on Moolyet, alt. 2000 ft., Beddome. SINGAPORE, Ridley. A little known species, probably only D. Brandisii.

14. **D. longifimbriatus**, Gamble Bamb. Brit. Ind. 92, t. 81; leaves 12-14 by 2-3 in. oblong acuminate, auricles of sheath long falcate stiffly ciliate with curved bristles, spikelets very small glabrous, empty gls. broadly ovate striate, fig. gls. 1-2 ovate acute keeled often mucronate, anthers short apiculate.

BURMA: in the extreme south of the Mergui district (Herb. Calcutt.).

Leaves very large, base rounded unequal, petiole \(\frac{1}{2}\) in. wrinkled, pale and smooth beneath, midrib hairy beneath, nerves 12-18 pairs, transverse nervules of pellucid glands; sheath shining, callus narrow; ligule short, very hairy. Panicle large, branchlets solid, short; rachis slender, flexuous, glabrous; heads (young only seen) bracteate. Ovary ovoid, glabrous, style hairy, stigma plumose.—An imperfectly known species, best distinguished by the falcate long-fringed auricles of the leaves.

IMPERFECTLY KNOWN SPECIES.

15. **D. Parishii**, Munro in Trans. Linn. Soc. xxvi. (1868) 149; panicle of globose interrupted dense heads, spikelets about $\frac{1}{3}$ in, ovoid subobtuse nearly glabrous compressed, empty gls. 1-2 ovate acute many-nerved ciliate, flg. gls. 2-3 similar glabrous, upper mucronate tessellately nerved ciliate, anther tip obtusely acute. Brandis For. Fl. 570; Gamble Bamb. Brit. Ind. 93, t. 82.

The PANJAB HIMALAYA, Parish.

Flowers nearest D. Hookeri (of which it is possibly a planted specimen), differing in the glabrous gls. and obtusely acute anthers.

16. **D. Collettianus**, Gamble Bamb. Brit. Ind. 93, t. 83; heads of spikelets $\frac{1}{2}-1$ in. diam. bracteate with 6-12 fertile and a few sterile fls. rachis pubescent, spikelets $\frac{1}{2}-\frac{3}{4}$ in. soft white-pubescent, empty gls. 2 ovate acute many-nerved midrib thickened, flg. gls. 2-4 and an imperfect ovate-

lanceolate shortly mucronate pubescent many-nerved, palea larger than the fig. gl., keels long-ciliate with white hairs, anthers obtusely apiculate.

UPPER BURMA; Fort Stedman, Abdul Huk. The softly white-hairy spikelets are diagnostic.

139. MELOCALAMUS, Benth.

Stem semiscandent from a stout rootstock. Stem-sheaths hard, cylindric, suricled. Leaves large, petioled, transverse nervules 0. Panicle large. Spikelets in dense heads, very small, rachilla continuous and produced beyond the upper gl.; empty gls. 2, broad, obtuse, many-nerved; fig. gls. 2, bisexual but one only fertile; palea very broad, cymbiform, membranous. Lodicules 3, large, ciliate. Stamens 6, filaments short, free, anthers obtuse. Ovary glabrous, style short, stigmas 2-3 plumose. Grain very large, depressed-globose, pericarp tough; seed large, fleshy.

M. compactifiorus, Benth. in Journ. Linn. Soc. xix. (1881) 134; Gamble Bamb. Brit. Ind. 94, t. 84. Pseudostachyum compactifiorum, Kurz For. Fl. Burm. ii. 567; Ind. Forester, i. t. II. fig. 13.

EASTERN BENGAL and BURMA; from Silhet to Arracan, Murtaban, and the Ruby Mines district.

Stems 15 100 ft. by \(\frac{1}{2}\)-1 in. diam., rough, spreading and arching over tall trees, nodes thickened; internodes grey green, 14-24 in. Stemsheaths about 6 by 3 in., smooth or strigose, mouth dilated; blade long-acuminate, dilating into a narrow dark reflexed crescentic auricle fringed with stiff bristles, hispid towards the base; ligule narrow, entire. Leaves 6-10 by 1-2 in., oblong-lauceolate, tip subulate penicillate twisted, base rounded, petiole hairy, midrib narrow, nerves 8-12 pairs; sheath striate, young strigose, mouth truncate, auricle lunate reflexed; ligule narrow. Panicle interrupted, often leafy, heads \(\frac{1}{2}\)-\frac{1}{2}\ in. diam., subglobose, rachis flexuous pubescent, laterally flattened. Spikelets \(\frac{1}{10}\) in., or rather more, obtuse or truncate, 2-cleft; empty gls. ventricose; fl. gls. similar, often ciliate. Grain 1-1\(\frac{1}{2}\) in. diam., seated in the persistent glumes.

140. PSEUDOSTACHYUM, Munro.

Shrubby, rootstock creeping. Stem-sheaths short. Leaves large, tessellately nerved. Panicle with drooping spikes. Spikelets small, solitary in the axils of narrow bracts, 1-fld., rachilla produced with imperfect gls.; empty gl. usually solitary, broad, mucronate, about 7-nerved; flg. gl. similar; palea thin, convolute, 2-keeled. Lodicules 3-5, large, ciliate. Stamens 6, anthers apiculate. Ovary linear-oblong, glabrous, style long rigid, stigmas 2 hairy. Grain depressed-globose.

P. polymorphum, Munro in Trans. Linn. Soc. xxvi. (1868) 142, t. 4; Gamble Bamb. Brit. Ind. 96, t. 85.

SIKKIM HIMALAYA, ASSAM, the GABROW HILLS, MUNNIPORE & BURMA,

Griffith, &c.

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Stems up to 50 ft., by 7-12 in. diam., arising singly from the rootstock, often subscandent, nodes hardly swollen, internodes 7-12 in. by 1 in. diam., at first glaucous, walls very thin. Stem-sheaths shorter than the internodes, triangular, truncate, strigose with brown hairs, auricle very short with a tuft of stiff bristles; blade long-acuminate in young shoots, base as broad as the truncate top of the sheath; ligule short. Leaves 4-14 by 1-2 in., narrowed into the stout 1-1 in.

petiole, midrib pale, nerves 7-11, nervules oblique; ligule short. Panicle large, leafy, branches fascicled, rachis wiry angled. Grain subtended by the gls. and lodicules, pericarp crustaceous.—Spikelets in diseased specimens converted into rounded softly hairy masses.

141. TEINOSTACHYUM, Munro.

Shrubby or arborescent; stems thin, arching. Stem-sheaths usually thin. Leaves various. Panicle spiciform, on leafy branches. Spikelets in bracteate whorls, long, narrow, many-fld., upper and lower fls. imperfect; empty gls. 1-2, mucronate; fl. gls. similar, mucros longer; palea convolute, keels ciliate. Lodicules 3, 3-9-nerved. Stamens 6, filaments free, slender. Anthers obtuse or obtusely apiculate. Ovary ovoid or depressed-globose, apex produced enclosing the style, stigmas 2-3 plumose. Grain ovoid, acuminate, beaked, pericarp crustaceous.—Species the following.

1. T. Griffithii, Munro in Trans. Linn. Soc. xxvi. (1868) 143, t. 3; stem-sheaths auricled, leaves 6-10 by $\frac{3}{4}-l\frac{1}{2}$ in. oblong-lanceolate glaucous beneath, spikelets 2-3 in. linear puberulous, empty gls. 1 or 2 (the second sterile) narrowly ovate mucronate, fl. gls. 3-5 ovate acute mucronate 9-11-nerved, lodicules glabrous. Gamble Bamb. Brit. Ind. 98, t. 86. Cephalostachyum Griffithii, Kurz For. Fl. Burma, ii. 566.

The Khasia Hills, Assam, Chittagong & Burma.

Stems 25-50 by ½ ¼ in. diam., slender, arching, straggling or subscandent, branches whorled, internodes 18-26 in., walls thin. Stem-sheaths 6 by 1½ in. or more, strigose with white hairs above; blade 3-4 in., dilated into large auricles fringed with long curved reflexed bristles, shaggy within; ligule short. Leares cuspidate, base rounded, petiole wrinkled, midrib with clusters of long hairs at the base, nerves 8-10 pairs with transverse pellucid glands; sheath keeled, auricles falcate and short ligule ciliate with deciduous hairs. Panicle leafy, branches often whip-like with few often pedicelled spikelets or axillary fascicles, rachis smooth striate; rachilla jointed between the gls. Palea longer than the fl. gl., keels fringed half way down, 4-nerved on each side. Lodicules ovate-lanceolate, glabrous, 7-9-nerved. Anthers yellow. Ovary stipitate, glabrous, style triquetrous. Grain obliquely ovoid, tapering at both ends, beaked, glossy.

2. T. Wightii, Beddome Fl. Sylvat. t. cccxxiii.; Forest. Man. p. ccxxxiii. (excl. Syn.) stem-sheaths papery hirsute top truncate not auricled, leaves 6-15 by 1-2 in. oblong-lanceolate, panicle with spiciform drooping branchlets, spikelets ½-1 in., empty gl. 1 ovate mucronate 5-7-nerved dorsally hirsute, fl. gls. 1 or 2 mucronate nerved transversely, lodicules short ciliate. Gamble Bamb. Brit. Ind. 99, t. 87.

WESTERN GHATS, alt. 3-5000 ft., from N. Canara to Cape Comorin.

Stem 10-20 ft., by 1-14 in., semi scandent, branches pendulous, nodes narrowly ringed; internodes bright green, rough above, walls thin. Stem-sheaths 10-12 by 1-14 in., hairs black-brown; blade subulate, 5-7 in., decurrent on the sheath; ligule r_{10}^{1} in. Leaves acuminate, tip scabrous twisted, whitish and sparsely hairy beneath, midrib broad yellowish, nerves 6-7 pair, tessellate by glands; sheath glabrous; ligule narrow. Panicle large, spiciform branches bracteate, rachis smooth, slender. Rachilla of spikelets slender, flattened and concave below, thickened and ciliate above. Lodicules ovate, 3-5-nerved. Ovary stipitate, depressed-globose, smooth, style included in the long beak of the ovary. Grain stoutly stipitate, ovoid, beaked, glabrous.

3. T. attenuatum, Munro in Trans. Linn. Soc. xxvi. (1868) 143;

stem- and leaf-sheaths not auricled pale strigose, leaves 3-6 by \(\frac{1}{2} - 1 \) in, panicle leafy, spikelets 1 in. clustered at the nodes of simple stiff terminal spikes, empty gl. 1 ovate mucronate 7-nerved ciliate, fl. gls. 2-3 longer 9-11-nerved and 1-2 terminal imperfect, lodicules lanceolate tip ciliate. Beddome Fl. Sylvat. Forest. Man. p. ccxxxiv.; Trim. Cat. Ceyl. Pl. 110; Gamble Bamb. Brit. Ind. 100, t. 88. Bambusa attenuata, Thwaites Enum. Pl. Zeyl. 375.

CEYLON; Central Province, alt. 4-6000 ft., Thwaites, &c.

Stems 12-25 ft. by \(\frac{1}{2}\)-1 in. diam., tufted, tips filiform, wiry, nodes with many branches. Leaves smooth and pale beneath, tip subulate twisted scabrous, midrib faint, nerves 3-4 pairs; sheath sparingly strigose, margins ci inte, mouth truncate, fringed with deciduous bristles; ligule short. Panicle leafy, usually of short spikes clustered at the nodes, clusters bracteate composed of several barren spikelets and a few longer often curved fertile, rachis smooth swollen above. Lodicules 3-nerved. Filaments long, twisted. Ovary ovoid, acuminate, glabrous, style long, stigmas 3. Grain narrowed at both ends, beaked, glabrous.

4. T. Dullooa, Gamble Bamb. Brit. Ind. 101, t. 89; stem-sheaths not auricled, leaves variable, spikelets ½-1 in. in a panicle of spiciform branches subtended by long truncate bracts softly pubescent, empty gls. 2 small truncate, fig. gls. ½ in. acuminate hairy 10-nerved, palea as long glabrous convolute not keeled, rachilla jointed produced into a long point.

BHOTAN, ASSAM, SILHET and the hills eastwd. to CHITTAGONG and UPPER BURMA.

- Stems 20-30 ft. by 1-3 in. diam., tufted, sometimes scandent; nodes dark green, little prominent; internodes 16-40 in., dark green with a few whitish hairs; glossy, white beneath the nodes. Stem-sheaths variable, 4-12 in., strigose with white hairs, top concavely truncate loosely fringed with stiff bristles; blade 3-6 in., narrow, convolute, very hairy within, base rounded; ligule long, fimbriate. Leaves oblong-lanceolate, subciliately acuminate, tip twisted scabrid, base rounded, petiole \(\frac{1}{2}\) in., pubsecent or glabrescent beneath, midrib pale, nerves 6-10 pairs, tessellate by pellucid dots; sheath striate, margins ciliate, mouth with stiff deciduous bristles, callus ciliate or glabrous; ligule long-fimbriate. Overy glabrous; style, long re-idish.
- 5. T. Helferi, Gamble Bamb. Brit. Ind. 102, t. 90; stem-sheaths thick brittle top truncate with a narrow long-fringed band, leaves 6-18 by 1-3 in. oblong-lanceolate, panicle of long terminal whip-like densely hairy flexuous spikes bearing distant heads of few sterile spikelets which consist of 2-3 striate mucronate hairy empty gls. Bambusa Helferi, Munro in Trans. Linn. Soc. xxvi. (1868) 114. Pseudostachyum Helferi, Kurz in Journ. As. Soc. Beng. xlii. (1872) ii. 253, For. Fl. Burm. ii. 568.

GARROW, KHASIA and JAINTEA HILLS, alt. 3500 ft., PEGU and MARTABAN. Stems bushy or climbing, 20-40 ft. by 1-1½ in. diam. arching to the ground and rooting, young strigose with white hairs, nodes thickened whitish; internodes 20-50 in., young white-velvety, old with a white band, walls very thin. Stemssheaths 8-10 in., persistent, sparsely strigose with white bristles; blade lanceolate, glabrous or shortly hispid, decurrent on a fringed band on the top of the sheath; ligule narrow, fringed with stiff white hairs. Leaves very variable, unequal-sided, cuspidately accuminate, glabrous and glaucescent beneath, midrib stout, nerves 7-15 pairs, tessellate by pellucid glands; sheath glabrous, auricle long-fringed deciduous, callus smooth; ligule narrow, fringed with fragile hairs.—Very near T. Griffithsis.

142. CEPHALOSTACHYUM, Munro.

Shrubby bamboos. Stems slender, straight. Stem-sheaths auricled. Leaves various, shortly petioled. Spikelets 2, in terminal globose heads, or

a patricle of bracteate heads, 1-fid., elongate, rachilla produced beyond the fl.; empty gls. 2-3, broad, chaffy, many-nerved, usually long-awned; fig. gls. more membranous, convolute, awas shorter; pales thin, manynerved, keels 2 approximate. Lodicules 3, 3-5-nerved. Stamens 6, free, anthers long. Ovary stipitate, ovoid, narrowed into a long thickened style, stigmas 2-3, plumose. Grain oblong, beaked, pericarp separable. Species all Indian.

Spikelets in a solitary head.

1. C. capitatum, Munro in Trans. Linn. Soc. xxvi. (1868) 139; leaves 4-8 by 1-2 in. ovate-lanceolate base unequally rounded, head 1-11 in. diam., bracts broad long-awned glabrous, spikelets 1-1 in. terminating short spikes, palea obtusely mucronate tip entire, anthers obtuse. Gamble Bamb. Brit. Ind. 104, t. 91. Bambusa capitata, Wall. Cat. n. 8913.

SIRRIN and BHOTAN HIMALAYA, alt. 2-8000 ft., KHASIA, JAINTEA, and NAGA HILLS.

Stems 12-30 ft. by 1-11 in., semi-scandent; nodes not prominent, internodes often 3 ft. or more, walls thin. Stem-sheaths of young stems papery, 6-12 by 2-3 in., strigose with pale brown hairs, mouth triangular, of the longer upper truncate, of the shorter lower retuse; blude long, hairy within, base rounded, decurrent into rounded sometimes fringed auricles; ligule narrow. Leaves pale green, whitish beneath, glabrous on both surfaces, midrib prominent, nerves 4-10 pairs, pellucid dots oblique; sheaths smooth, shining, auricle short with curved cilia. Empty als. softly hairy below; lower 1-3 fig. gls. sterile; palea hairy between the keels, rachilla produced. Ecdicules ovate-lanceolate, 8-5-nerved, shortly ciliate. Anthers long. tips emarginate. Ovary ovoid, style often twisted, stigmas 2 hairy. Grain depressed-ovoid, beaked, shining, pericarp crustaceous.

Var. decompositum, Gamble l. c. 105; spikelets in spicate almost paniculate

clusters, many fertile.-Sikkim and Khasia Hills.

2. C. pallidum, Munro in Trans. Linn. Soc. xxvi. (1868) 139; leaves 1-5 by 1-1 in. base unequally rounded, heads about 1 in., bracts broad rounded, spikelets 1-1 in., palea 2-fid, anthers long-apiculate. Kurz For. Fl. Burma, ii. 563; Gamble Bamb. Brit. Ind. 105, t. 92. Bambusa andropogonifolia, Griffith Itin. Notes, 124, No. 417.

KRASIA, MISHMI, PATKOY and MUNNIPORE HILLS, secending to 5000 ft.,

Griffth, &c.

Shrubby or subarboreous, branches whorled. Leaves pale g.sen, tip capillary, glabrous or puberulous beneath, not tessellate, midrib pale, nerves 4-6 pairs; sheath striate, margins ciliate, auricle rounded with a few deciduous cilia; liquie long. Head in the axil of a leaf, of many- long-awned empty gls. or sterile f. gls. or with a few exserted fertile spikelets, all bracteate at the base; empty gls. concave, awned. many-nerved; fig. gls. similar, awn shorter than the gl.; palea many-nerved, tip and base hairy, rachilla shortly produced. Lodicules pubescent and ciliate. Ovary ovoid-lanceolate, style long conical, stigmas 2 hairy. Grain globosely ovoid, top conical and beaked, wrinkled.

3. C. latifolium, Munro in Trans. Linn. Soc. xxvi. (1868) 140; stem sheaths linear, oblong top narrow, leaves 10-16 by 1-4 in. ovate or ovatelanceolate base unequal cuneate or rounded, sheaths not fringed, heads 11-2 in. diam. of clustered sterile and 1-fld., fertile spikelets 1-1 in. long with broad awned bracteoles, tip of palea entire, anthers obtusely mucronate. Gamble Bamb. Brit. Ind. 106, t. 93.

BROTAN and MUNNIPORE HILLS, alt. 5-7000 ft., Griffith, &c.

Shrubby semi-scandent. Stems thin, rough, dark green, whitish below the nodes which are conspicuously ringed. Stem-sheaths 6-9 by 2-3 in., papery, sides

parallel, top concave with sub-acute triangular glabrous auricles; blade 4-5 by \(\frac{1}{2}\)-\frac{1}{2} in., subulate; ligule broad. Leaves glabrous, base cuneatè or rounded, petiole wrinkled, midrib pale prominent, nerves 8-18 pairs, pellucid dots distant; sheath striate, margins ciliate produced up to the broad ligule; callus broad, thick, emarginate. Spikelets glabrous, empty gls. ovate-lanceolate, glabrous, long-awned; fig. gls. acuminate, awn shorter; palea obtuse, tip hairy, nerves reticulate; rachilla shortly produced. Lodicules 3-nerved. Ovary ovoid, style long flattened, stigmas 2 short plumose. Grain broadly ovoid, stipitate, curved above. beaked, pericarp crustaceous.

4. **C. Fuchsianum**, Gamble Bamb. Brit. Ind. 107, t. 94; stemsheaths thin top deeply concave with a bristly fringe in the sinus, leaves 8-14 by 2-4 in., ovate-lanceolate, head $2\frac{1}{2}$ in. diam., simple globose or compound elongate and lobed, spikelets $\frac{1}{2}$ -1 in. glabrous sterile and fertile mixed with awned bracts, palea 2-fid anther tip apiculate or forked.

BHOTAN and the DUPHLA HILLS, alt. 6-8000 ft., Fuchs, Lister, Gammie, &c. Arborescent, semi-scandent; stems small, soft, thin-walled, pale, branches whorled. Stem-sheaths 12 by 4 in., strigose with light brown hairs, sides nearly parallel, margins reticulately nerved, young cylindric; blade in the base of the sinus, 6-8 in., subulate, pubescent below; ligule small. Leaves cuspidately acuminate, base angled or rounded, midrib shining, nerves 7-10 pairs, tessellate by pellucid dots; sheath soft, margins thickly long-ciliate, auricle elongate thickly clothed with white bristles \(\frac{1}{2} \) \(\frac{1}{3} \) in long; ligule moderate, ciliate. \(Empty \) gls. ovate, long-awned, glabrous, 17-19-nerved; fig. gl. longer, awn shorter, 21-23-nerved and cross-nervuled; palea pubescent, 2-keeled and 5-6-nerved on each side; rachilla shortly produced. \(Lodicules 3-5-nerved, ciliate. Ovary narrowly ellipsoid, style thick, stigmas 2 short. \(Grain as in C. latifolium, but tip more rounded, pericarp crustaceous.

- ** Spikelets in panicled or spicate heads or fascicles.
- 5. **C. pergracile,** Munro in Trans. Linn. Soc. xxvi. (1863) 141; stem-sheaths very short 2-auricled strigose with black deciduous hairs afterwards polished, leaves 6-14 by 1-2½ in. linear-lanceolate rough on both surfaces, spikelets ½-½ in. diam. bracteate clusters forming filiform drooping spikes, gls. 3-4, empty gls. 0, lower 1-2 sterile, fertile solitary densely hairy with a terminal sterile, palea long 2-fid, authers obtuse purple. Kurz For. Fl. ii. 564; Gamble Bamb. Brit. Ind. 108, t. 95.

Throughout Burma, Assam, The Naga HILLS and CHOTA NAGPORE.

Arborrous, deciduous. Stems 30-40 ft. by 2-3 in. diam., tufted, erect, glaucous, whitish below the scarcely thickened nodes; internodes 12-18 in., walls very thin. Stems-sheaths 4-6 by 6-8 in.; blade 2 in., densely hairy within, decurrent in a waved fringe bordering the top of the sheath and fringed auricles; ligule very narrow. Leaves thin, base rounded or cuneute, subglaucous beneath, midrib conspionous, nerves 7-13 pairs, sparingly tessellate; sheath glabrous, mouth auricled, callus small cliffiate; ligule very narrow. Panicle large; heads 1½-2 in. apart, bracts small chaffy, rachis wiry. Lodicules narrow, tip ciliate. Ovary smooth, base subglobose, narrowed into a trigonous style, stigmas 2-3 stout. Grais ½ in., obovate-oblong, grooved on one side, beak as long as itself.

6. C. flavescens, Kurz in Journ. As. Soc. Beng. xlii. (1873) ii. 252, For. Fl. Burm. ii. 564; stem-sheaths short, top triangular truncate smooth or strigose with white or pale brown hairs, leaves 3-6 by \(\frac{1}{2} \) in. linear, sheath with narrow auricles, spikelets \(\frac{1}{2} \) in. long linear acuminate hairy, empty gls. 1-2 ovate-lanceolate mucronate hairy 7-9-nerved, fl. gl. solitary similar, palea 2-mucronate, anthers obtuse or acute yellow.

Gamble Bamb. Brit. Ind. 109, t. 96. Melocanna lutescens, Kurz in Herb. Calcutt.

BURMA; Pegu? (cult. in Calcutta and Madras gardens).

Evergreen, subarborescent. Stems 10-20 ft. by 1-1½ in. diam., smooth, dull green, at length yellow, nodes not prominent; internodes rather long. Stem-sheaths 4-5 by about 5 in., smooth or strigose with pale or brown hairs; blade 1-1½ in., erect, base cordate decurrent as a waved fringe with pointed long auricles edged with stiff curved bristles; ligule narrow. Leaves acuminate, glabrons or sparsely hairy beneath, base contracted, midrib narrow, nerves 4-6 pairs; sheath smooth, glabrons, callus very narrow, auricles long narrow; ligule narrow. Panicle of few whorled slender branches with clusters of spikelets 2-2½ in. apart; palea with hairy margins. Lodicules oblong, tip ciliate, 3-5-nerved. Ovary ovoid, acuminate, smooth; style trigonous, stigmas white-hairy.

7. C. virgatum, Kurz For. Fl. Burma, ii. 565; panicle leafless drooping, branchlets fascicled bearing lax distant heads of few nearly glabrous fertile and sterile spikelets, rachis smooth flattened on one side, spikelets \(\frac{1}{2}\) in. nearly glabrous narrow acute with 2 small sterile fls. at the base, empty gl. short ovate mucronate, flg. gl. convolute coriaceous mucronate, palea 2-mucronate, anthers obtuse. Gamble Bumb. Brit. Ind. 110, 132, t. 97. Melocanna virgata, Munro in Trans. Linn. Soc. xxvi. (1868) 133.

UPPER BURMA; on the Mogaung river, Griffith; Bhamo district, Oliver.

A medium-sized, slender, tufted Bamboo. Stems erect, dark green, young white scurfy, nodes not thickened; internodes 18-24 by 4 in. diam., regular, walls thin. Stem-sheaths 6-8 by 7-10 in. broad at the base, pale, narrowed to a nearly straight top 5-6 in. broad, strigose with golden hairs; blade 4-5 in., usually recurved, decurrent along the top of the sheath in a narrow straight band bordered with stiff recurved bristles, glabrous above, strigose beneath; base 1-1½ in. broad cordate, tip cuspidate, margins incurved; ligule narrowed, fimbriate. Leaves rather variable, thin, 6-12 by 1½-2¾ in., oblong- to linear-lanceolate, cuspidately acuminate, rough on both surfaces, tip and margins scabrous, pale beneath and slightly hairy, mid-rib pale broad, nerves 10 pairs with 5-7 intermediate, cross-nervules few; sheath smooth, striate, keeled, ending in a narrow ciliate callus, and bearing short bristly auricles; ligule very short, fimbriate. Panicles large, heads bracteate; bracts narrow chaffy. Lodicules lanceolate, acuminate, shortly ciliate, faintly 3-nerved. Otary ovoid, glabrous, style thickened; stigmas 2-3, purple, plumose.

143. DINOCHLOA, Büse.

Lofty evergreen scandent Bamboos. Stems zigzag, usually covered with persistent sheaths; nodes with a broad leathery ring left by the sheath. Stem-sheaths thick, loosely clasping, base wrinkled. Leaves large, rather soft, transverse nervules of pellucid glands. Panicle large, compound, of slender spicate clusters of spikelets. Spikelets very many, minute, in subglobose sessile heads on short branchlets. 1-fld.; rachilla inarticulate, not produced; empty gls. 1-4 broad, very obtuse, upper gradually larger; fl. gl. similar; palea convolute, not keeled, as long or longer than the gl. Lodicules 0. Stamens 6, free short. Ovary ovoid, glabrous, style short. Grain ovoid, acuminate.—Species, the following.

1. D. Tjankorreh, Büse in Miq. Pl. Jungh. 388; stem-sheaths narrowed to the mouth, leaves 6-10 by 1-1½ in. Miq. Fl. Ind. Bat. iii. 415; Munro in Trans. Linn. Soc. xxvi. 153, t. 5; Kurz Ind. Forester, 352; Gamble Bamb. Brit. Ind. 112. Bambusa scandens, Blume ex Nees in

Flora, vii. (1824) 291. Nastus Tjangkorreh, Schultes Syst. Veg. vii. 1358; Kunth Enum. Pl. i. 430; Steud. Syn. Gram. 333. Chusquea amplopaniculata, Steud. l.c. 337; Mig. l.c. 415.

MALAY PENINSULA; Perak, Ridley .- DISTRIB. Malay and Molucca Islds.

Stems 100 ft. by 1 in. diam. or more, green, glossy, nodes swollen, of the branches often thorny; internodes 9-18 in., hairy above, walls thin. Stem-sheaths loose, leathery, cylindric, narrowed to the non-auricled mouth, sparsely bristly; blade ovate-lanceolate, minutely hispid above; ligule rather broad. Leaves lanceolate, rather soft, base narrowed, petiole very hairy, smooth on both surfaces, mid-rib conspicuous, nerves 7-9 pairs; sheaths strigose at length glabrous, mouth rounded with long white bristles; ligule rather broad, long-ciliate. Panicle compound, branches thin, wiry; rachis curved, striate, flattened on one side; nodes with a ring formed by the base of the fallen bracts; clusters with few fertile and many empty gls. Spikelets of in. or less, ovoid, glossy, brown, glabrous; empty gls. with 1-2 smaller at the base, convolute, 5-7-nerved; flg. gl. similar. Stamens included, anthers acute. Stigma 2-fld, not plunose. Grain 10-1 in., fleshy.

Var. andamanica, Gamble I. c. t. 98; spikelets straw-colrd., leaves up to 12 by 2 in. softly ovate-lanceolate, mouth of sheaths more ciliate, ligule more fimbriate. D. andamanica Kurz in Journ. As. Soc. Beng. xlii. (1873) ii. 253, For. Fl. Burm.

ii. 570.—Andaman and Nicobar Islds., Sieber, Kurz, &c.

2. **D. M'Glellandi**, Kurz in Journ. As. Soc. Beng. xlii. (1873) ii. 253, For. Flor. Burm. ii. 371 (Maclellandi); stem-sheaths truncate at the mouth, leaves 6-18 by 1-4 in. Gamble Bamb. Brit. Ind. 113, t. 99. Bambusa M'Clellandi, Munro in Trans. Linn. Soc. (1868) 114.

CHITTAGONG, PEGU and MARTABAN, Kurz, &c.

Stem climbing, 100 ft., or short and straggling, 1-2 in. diam., grey green, nodes swollen; internodes 6-8 in., young often angled, strigose with brown pungent hairs. Stem-sheaths 6-9 in. by 7-9 in. at the base and 2-3 at the top, cylindric, leathery, strigose with golden-brown hairs ending in a narrow dark glabrous margin and top; blade lanceolate, glabrous without, densely hairy within, base rounded decurrent on the sheath; ligale entire or subserrate. Leaves broadly oblong-lanceolate, base unequally rounded, narrowed into a broad thick petiole \(\frac{1}{2}\) in. long or less, glabrous on both surfaces, one or both margins retrorsely scabrid, mid-rib prominent, nerves 10-18 pairs; sheath transversely nerved, keeled, at first strigose, mouth produced into a rounded naked auricle; ligule entire or serrate.

144. SCHIZOSTACHYUM, Nees.

Erect or climbing, arborescent or shrubby Bamboos; stems usually slender, smooth, walls thin. Stem-sheaths short, cylindric, atricles small. Leaves broad, petioled. Panicle terminal, of spicate branches bearing heads of spikelets, often reduced to a spike of heads, rachis slender. Spikelets slender, fascicled, peduncled or 2-3-nate; empty gls. 1-3, narrow, usually mucronate, rachilla elongate between them and much beyond with a rudimentary gl.; fl. gls. 1-2, articulate below, convolute; palea like its gl., convolute, not keeled. Lodicules 0-4, narrow. Stamens 6, exserted, anthers narrow, filaments free. Ovary narrow, pericarp produced as a tubular beak enclosing the style, stigmas 3 short plumose. Grain ovoid, beaked, beak inclined, pericarp crustaceous; seed rounded.—Species 16, trop. Asia and Pacific.

- * Heads of spikelets in terminal simple spikes.
- 1. S. tenue, Gamble Bamb. Brit. Ind. 114, t. 100; leaves 4-6 by

1-1 in. linear-lanceolate, heads 1-3 in a spike bracteate, spikelets few about in. long, empty gis. 1-2 ovate acute 5-7-nerved, fig. gl., longer. S. elegantissimum, Kurz Ind. Forester, i. 348. (Bambusa elegantissima, Hassk. Pl. Jav. Rar. 42. Beesha elegantissima, Kurz ex Munro in Trans. Linn. Soc. xxvi. (1808) 146).

MALAY PENINSULA; Pahang, Malacca and Johore, Redley.

Stems graceful, slender, scandent. Leaves narrowed into a rather tong petiole, smooth and glabrous on both surfaces, midrib shining, nerves 3-5 pairs, distantly tessellate by glands, sheaths smooth truncate, callus broad; liggle very narrow. Rachie of spikes slender, curved; bracts chaffy, mucronate, yellowish. Spikelets narrow, acuminate; palea longer than its gl., 2-keeled, glabrous, 2-mucronate. Lodicules ovate, acute, 3-5-nerved. Stamess exserted, anthers linear tips rounded.

- 2. S. chilianthum, Kurz in Journ. As. Soc. Beng. xxxix. (1870) II. 88, Ind. Forester, i. 348; leaves 6-10 by \(^3\)4-1 in. linear-lanceolate, heads 3-6 in a spike, spikelets about \(^1\)2 in. long, empty gls. ovate mucronate striate glabrous, fig. gl. longer. Gamble Bamb. Brit. Ind. 115. t. 101. Chloothamnus chilianthus, Buese in Pl. Jungh. 387; Miq. Fl. Ind. Bat. ii. 415. Melocanna gracilis, Kurz ex Munro in Trans. Linn. Soc. xxvi. (1868) 133.—Bambusa, Wall. Cat. n. 5032.
- Stem 6-8 ft. by \(\frac{1}{2}\)-\(\frac{1}{2}\) in. diam., smooth, glossy, nodes not prominent; internodes fistular, glabrous; flowering and leafing branches together half-whorled at the nodes with many bract-like sheaths; branchlets slender, curved, smooth. Stem-sheaths glabrous, smooth, truncate, margins ciliate; blade narrowly lanceolate, base rounded, hairy, decurrent in a long fringed band, suricles narrow long-fringed; ligule narrow long-fringed. Leaves long acuminate, setaceous point sometimes \(\frac{1}{2}\) in., midrib not prominent, nerves \(\frac{4}{2}\)-6 pairs, tessellate by pellucid glands; sheath glabrous, mouth truncate bearing about 10 stiff white decidous bristles, auricles short, callus narrow. Heads about \(\frac{1}{2}\) in. broad, rachis slender, grooved, glabrous. Spikelets acuminate. Pales \(\frac{2}{2}\), mucronate, keeled above only. Lodicules \(\frac{3}{2}\), \(\frac{3}{2}\)-5-nerved, ciliate. Ovary oblong, stigmas \(\frac{3}{2}\) plumose purple. Grain nearly \(\frac{1}{2}\) in., beak inclined.
 - •• Heads of spikelets in panicled spikes.
- 3. S. Blumei, Nees Agrost. Bras. 535; leaves 9-10 by 1\frac{1}{4} in. on sterile branches up to 16 in. oblong-lanceolate, spikelets under \frac{3}{2} in. cylindric, rachilla ciliate, empty gls. 2 oblong long-mucronate glabrous, flg. gl. longer, paleæ 1 or 2 inner convolute, lodicules 0, anthers obtuse. Kunth Enum. Pl. i. 435; Rupr. Bamb. 43, t. 16, 17, f. 4; Stend. Syn. Gram. 332; Miq. Fl. Ind. Bat. iii. 424; Munro in Trans. Linn. Soc. xxvi. (1868) 136; Kurz Ind. Forester, i. 350; Gamble Bamb. Brit. Ind. 116, t. 102. Melocanna tenuispiculata, Kurz in Hort. Buitenz. and Calc.

SINGAPORE, Ridley .- DISTRIB. Java.

Stems 30 ft., hollow, fragile, glabrous. Stem-sheaths cylindric, slightly narrowed to the ciliate truncate mouth, strigose with white bristles; blade leafy, erect; ligule narrow. Leaves acuminate, base rounded or narrowed, rough on both surfaces, pubescent beneath, midrib narrow, nerves 5-6; sheath smooth, keeled, mouth trancate and margins ciliate with white bristles; ligule short finbriste. Spikes of panicle with long spreading erect or deflexed spikelets \(\frac{1}{2} - \frac{1}{2} \) in. long and chaffy bracts, rachis very slender; empty gls. 2, striate. Anthers green, obtuse. Overy narrowly ellipsoid.

4. S. latifolium, Gamble Bamb. Brit. Ind. 117, t. 103; leaves 9-12 by 1\frac{1}{2}-2\frac{1}{2} in. oblong acuminate, spikelets 1-1\frac{1}{2} in. long acuminate, empty

417

MALAY PENINSULA; Pahang, Ridley.

Leaves smooth on both surfaces, base rounded, petiole $\frac{1}{3}$ in. wrinkled, midrib prominent beneath, nerves 10-12 pairs; sheath keeled, smooth, callus broad, auricle large falcate bearing long bristles; ligule short, long-ciliate. Panicle 6-12 in. Spikelets mixed with ovate-lanceolate glabrous bracts, shortly pedicelled; empty gls. distant at the base; margins of fig gl. often ciliate; palea lanceolate, 2-mucronate, dorsally keeled or channelled. Lodicules 3-4, $\frac{1}{10}$ - $\frac{1}{2}$ in., 4th longer (a modified stamen?). Anthers long, narrow. Ovary narrowly lanceolate.—Near S. longispiculatum, Kurz Ind. Forester, i. 351, but differs in the presence of lodicules and in the penicillate anther tips.

5. **S. aciculare,** Gamble Bamb. Brit. Ind. 117, t. 104; leaves 6-9 by $1\frac{1}{2}-2$ in. ovate-oblong cuspidate, petiole pubescent, spikelets $1\frac{1}{4}-1\frac{1}{2}$ in. needle-like, empty gls. 2 oblong mucronate pubescent, fig. gl. linear convolute appressedly hairy long-mucronate, lodicule 1, anthers obtuse tip penicillate.

MALACCA; at Rupayoong, Alwis.

A small bamboo. Leaves almost elliptic, base rounded or narrowed, tip an obtuse scabrous hairy point, pale and smooth beneath, midrib hardly prominent, nerves 10 pairs; sheath smooth, mouth with a few long bristles, callus rounded. Spikes slender, rachis flattened on one side; bracts few, short. Spikelets very long, narrow, on short bracteate peduncles; empty gls. 2, pubescent, oblong, mucronate; palea as long as the fig. gl., mucronate, glabrous; rachilla short, grooved, glabrous. Lodicule 1, narrowly lanceolate, glabrous. Anthers very long, narrow. Ovary narrowly ovoid, glabrous.

145. MELOCANNA, Trin.

Arborescent unarmed Bamboos. Stems solitary on the branches of a rhizome, distant. Stem-sheaths short, brittle, shortly auricled, blade very long. Leaves broad, petioled, smooth. Panicle large, compound, of spicate one-sided spikelets. Spikelets 2-3, fascicled in bracts in the axils of the spikes, acuminate with 1 fertile and 1 or more sterile fis.; empty gls. indefinite, acuminate, mucronate, striate; fl. gl. similar; palea like its gl. convolute not keeled. Lodicules 2, narrow. Stamens 5-7, free or irregularly connate. Ovary glabrous, style elongate, stigmas 2-4 shortly hairy. Fruit very large, pyriform, long-beaked, pericarp very thick.—Species 1 or 2.

1. M. bambusoides, Trin. in Spreng. Neue Enterdeck. ii. 43, Syst. ii. 113 (excl. Syn. Lour.); stem-sheaths 5-6 in. strigose with whitish hairs abruptly truncate with rounded auricles, leaves 6-14 by 1-3 in. lanceolate or oblong-lanceolate, spikelets about ½ in. spinous glabrous, empty gls. 2-4 lanceolate, flg. gl. similar but thinner. Rupr. Bamb. 65; Steud. Syn. Gram. 331; Miq. Fl. Ind. But. iii. 423; Munro in Trans. Linn. Soc. xxvi (1868) 132; Kurz For. Fl. Burm. ii. 569; Gamble Bamb. Brit. Ind. 119, t. 105. Bambusa baccifera, Roxb. Corom. Pl. iii. 38, t. 243, Fl. Ind. ii. 197. Beesha Rheedii, Kunth in Journ. de Phys. xlv. (1822) 4; Revis. Gram. i. 141; Enum. Pl. i. 434 (excl. Syn.). B. baccifera, Schult. Syst. vii. 11. 1336. Nastus baccifera, Roxb. ex Rasp. in Ann. Sc. Nat. Ser. I. v. (1825) 442,

ASSAM, the KHASIA and GARROW HILLS, CHITTAGONG, ARRACAN, and TENASSERIM.

Evergreen. Stems solitary on branches of the rhizome, 50-70 ft. by $1\frac{1}{2}$ -3 in. diam., green, straight, unbranched till near the top, nodes a thin ring; internodes

12-20 in., walls thin. Stem-sheaths 5-6 in. by 6-12 at the base, yellow, margins straight for \$\frac{3}\$ up, then waved, auricles often long-fringed; blade up to 1 ft., base 1 in. broad, decurrent in a narrow strip along the top of the sheath; ligule very narrow, serrate. Leaves from fascicled branches, tip long twisted scabrous, glaucescent beneath, young hairy, margins ciliate, inner and 2-3 adjoining nerves scabrous, midrib prominent, nerves 8-12 pairs, tessellate by pellucid glands; sheath glabrous, auricles pointed, ciliate and bearing 10-12 large whitish bristles; ligule very short. Panicle with drooping branches. Spikelets about \$\frac{1}{2}\$ in., glabrous; empty gls. with sometimes abortive buds. Lodicules erose, 3-5-nerved. Fruit up to 3-5 by 2-3 in.

2. M. humilis, Kurz For. Fl. Burm. ii. 569; stem-sheaths very short glabrous? mouth much produced rounded inflated and sinuate, leaves 4-6 by 3-1 in. lanceolate to linear-lanceolate roughish puberulous beneath, base obtuse, petiole about 3 in., sheath glabrous mouth minutely auricled deciduously long-fringed. Gamble Bamb. Brit. Ind. 120, t. 106.

ARRACAN and PEGU, Kurz.

Known chiefly from the leaves and sheath. Stems 8-15 by 1 in. diam.; nodes hardly thickened, internodes about 1 ft. Blade of stem-sheath linear, erect, decurrent in a narrow nude green strip bordering the sinuses; ligule very narrow, entire.

146. OCHLANDRA, Thwaites.

Shrubby, gregarious, reed-like Bamboos. Stems erect, internodes rather long, thin-walled. Stem-sheaths thin, persistent, auricles small. Leaves as in Bambusa, margins cartilaginous, nerves many; sheath striate, fringed; ligule (except in one sp.) short. Spikelets fertile and sterile mixed, or whorled on terminal spikes or spicate panicles from a leafy branchlet, often very large, 1-fid.; empty gls. 2-5, usually mucronate; fig. gl. like the uppermost empty, mucronate; palea membranous, not or faintly 2-keeled. Lodicules 1 or more, usually appressed to the filaments. Stamens 6-120, filaments free or monadelphous, exserted; anthers long, narrow. Ovary narrow, style elongated, stigmas 3-6. Fruit large, ovoid, long-beaked, pericarp fleshy.—Species the following.

- * Stamens many, ligules short, filaments free.
- 1. O. Rheedii, Benth. ex Gamble Bamb. Brit. Ind. 121, t. 107; leaves 4-10 by \(\frac{1}{2}-\frac{1}{4} \) in. linear-lanceolate, sheath smooth, auricles falcate fringed with bristles, spikelets cylindric acute glabrous, sterile \(\frac{1}{2}-\frac{3}{2} \) in., fertile 1-1\(\frac{1}{4} \) in., empty gls. 2-3 broadly ovate mucronate many-nerved, flg. gl. larger subacute, anthers mucronate. Beesha Rheedii, Kunth Enum. Pl. i. 434 (excl. all cit. but Rheede); Rupr. Bamb. 65; Munro in Trans. Linn. Soc. xxvi. (1868) 144; Beddome Fl. Sylvat. Forest. Man. p. ccxxxiv. Melocanna Rheedii, Steud. Syn. Gram. 332. Bambusa scriptoria, Dennst. Schluess, Hort. Malab. 31.—Rheede Hort. Mal. v. t. 60.

COCHIN and TRAVANCORE, White, Johnstone, &c.

Stems erect, up to 16 ft. by 1 in. diam.; nodes somewhat raised; internodes about 17 in., walls \(\frac{1}{2}\) in. thick. Stem-sheaths 4-6 in., purplish-green, young hairy, margins ciliate, top rounded-truncate, auricles falcate long-ciliate; blade subulate, base hairy within; ligule short, ciliate. Leaves usually small, base rounded, smooth on both surfaces, midrib narrow, nerves 5-10 pairs. Spikes or spicate panicles terminal or axillary on leafy branchlets. Palea convolute, long-mucronate, base membranous. Lodicules many, \(\frac{1}{2}\)-\(\frac{1}{2}\) in., acute, glabrous, 1-7-nerved. Stamens 15-18. Ovary oblong, style embraced by the enlarged perigynium, stigmas 3, plumose. Fruit oblong, long-beaked.

Var. sivagiriana, Gamble l. c. 122, t. 108; spikelets rather larger, stamens up to 60, leaves generally larger.—Pulney and Sivagiri Hills, Beddoms.

2. O. stridula, Thw. Enum. Pl. Zeyl. 376; leaves 8-12 by 1\frac{1}{2}-2\frac{1}{2} in. oblong-lanceolate, young sheath hirsute, auricles falcate fringed with bristles, spikelets 1 in. cylindro-conical sparsely hairy, empty gls. 2-3 convolute mucronate ciliate, fig. gl. larger, anther tips 2-fid and mucronate. Trimen Cat. Ceyl. Pl. 110; Gamble Bamb. Brit. Ind. 123, t. 109. Beesha stridula, Munro in Trans. Linn. Soc. xxvi. (1868) 145; Beddome Fl. Sylvat. Forest. Man. p. ccxxxiv. Bambusa stridula, Moon Cat. Ceyl. Pl. 26.

CEYLON; in the southern parts of the Island, Thwaites.

Stems 6-18 ft. by \$-\frac{1}{2}\$ in, diam., tuited, light green, geniculate, nodes ringed; internodes 12-14 in., scabrous. Stem-sheaths persistent, cylindric, glabrous, young purple, tip rounded with falcate small fringed auricles; blade subulate. Leaves broad, somewhat rough beneath, base rounded, petiole broad, midrib slender, nerves 10-12 pairs, tessellate by pellucid glands. Spikelets in a terminal panicle, whorled, few fertile, rachis of spike long, rough, glauoous. Lodicules 6-12 or more, lanceolate, 1- many-nerved, convolute. Stamens up to 30, filaments free, flat. Ovary narrow, beak trigonous; stigmas 4-5, plumose, at first twisted. Fruit 1 in., ovoid, beak 1 in.

Var. maculata, Gamble l. c. 124; stem greyish-green mottled with dark purplish blotches. Teinostachyum? maculatum, Trim. in Journ. Bot. xxiii. (1885) 273,

Cat. Ceyl. Pl. 110.—Ceylon, Ferguson.

3. **O. Beddomei,** Gamble Bamb. Brit. Ind. 124, t. 110; leaves 6-8 by $1-l\frac{1}{2}$ in. oblong-lanceolate margins revolute, auricles decurrent fringed with bristles, spikelets $1-l\frac{1}{2}$ in. hirsute, empty gls. 2 ovate long-nucronate many-nerved, fig. gl. $1\frac{1}{3}$ in. ovate-lanceolate mucronate many-nerved glabrous, anther tips 2-fid and mucronate.

NILGHIBI HILLS; in the Wynaad district, Beddome.

Leaves long-acuminate, base unequally rounded, subglaucous beneath, midrib slender, nerves about 8 pairs; sheaths puberulous, margins ciliate, callus narrow. Punicle short, spicate, terminating a leafy branchlet; rachis stiff, puberulous. Spikkelets few together, cylindric-conical, 2-3-bracteate, hairs tuberous-based, brown, spreading; palea 1 in., membranous, acute or obtuse. Lodicules 5, all different, 3-7-nerved, entire or 2-fid. Stamens about 32. Ovary subglobose, beak embracing the style, stigmas 5-6 plumose.

- ** Stamens many, liqule short, filaments coherent.
- 4. O. travancorica, Benth. ex Gamble Bamb. Brit. Ind. 125, t. 111; leaves 6-18 by $2-1\frac{1}{2}$ in. broadly oblong-lanceolate, auricles short falcate spikelets $2-2\frac{1}{2}$ in. ovoid or ovoid-oblong, glabrous, empty gls. usually 3, lowest truncate tip subulate upper 2 in. long-acuminate, fig. gl. like the upper empty, anther-tips penicillate. Gamble Bamb. Brit. Ind. 125, t. 111. Beesha travancorica, Beddome Fl. Sylvat. t. occxxiv. Forest. Man. p. ccxxxiv.

TRAVANCORE and TINNEVELLY. alt. 2-5000 ft., Beddome, &c. (monopolizing miles of country).

An erect gregarious reed-like bamboo. Stems 6-20 ft. by 1-2 in. diam., nodes swollen and scarred; internodes 1½-5 ft., rough; walls very thin. Stem-sheaths 6-8 in., thin, vertically wrinkled, young strigose with tuberous-based hairs, tip truncately rounded, fringed with bristles; blade subulate. Leaves glabrous or scaberulous, base rounded, petiole broad, midrib thick below, nerves 12-17 pairs, tessellate by pellucid glands; sheath glabrous, keeled, margins ciliate, callus shining; ligule short, truncate. Spikelets a few fortile and a few much smaller sterile together in the axils of ovate-lanceolate smooth bracts with subulate deciduous tips; single

spikelets with 2-4 small sheathing bracts; gls. all many-nerved; pales acute, faintly 2-keeled. Lodicules 3, \(\frac{1}{2}\) in., membranous, 3-7-nerved. Stamens up to 120, filaments coherent. Ovary narrow, tip 4-angled, stigmas 5-6 plumose spirally twisted together. Fruit 2 in. by \(\frac{1}{2}\) in. diam., ovoid-obloug, beak 2 in., pericarp flesby.

Var. Aissuta, Gamble 1. c. 126, t. 112; spikelets densely brown velvety, leaves thicker, margins more cartilaginous, leaf-sheaths with appressed tuberous-based hairs.

-Travancore Hills, Beddome.

- *** Stamens many, liquie 1 in. or more, filaments free.
- 5. O. Brandisii, Gamble Bamb. Brit. Ind. 126, t. 113; leaves 10-20 by 11-3 in. oblong-lanceolate acuminate, auricles short fringed, spikelets 1-11/2 in. conical glabrous bracteolate with chaffy scales, gls. all manynerved, 3-4 lower empty thick ovate truncate tip subulate, upper thinner, flg. gl. membranous, anthers long-apiculate. Bambusa Wightii, Munro in Trans. Linn. Soc. xxvi. (1863) 111.—Wight Cat. n. 1009.

TINNEVELLY GHATS; at Courtallam, Wight, Brandis.

Leaves thick, base narrowed, glabrous on both surfaces, whitish beneath, petiole short broad wrinkled beneath, midrib stout, nerves 10-13 pairs strong, tessellate by pellucid glands; sheath striate, callus smooth rounded. Spike terminal, rachis thick, whorls of spikelets several in the axils of ovate glabrous bracts; palea like the fig. gl. but smaller. Lodicule solitary, \(\frac{1}{2}\cdot\frac{1}{10}\) in.; many-nerved, truncate and retuse. Stamens up to 60. Ovary glabrous, stigmas 5, plumose.

- **** Stamens 6 or fewer, unequal, filaments free or coherent, ligule short.
- 6. **C. Eddleyi**, Gamble Bamb. Brit. Ind. 127, t. 114; leaves 9-10 by 1-1½ in. oblong-lanceolate cuspidately acuminate, auricles rounded or falcate long-ciliate, spikelets about 1 in. appressedly hairy, empty gls. 1-2 ovate truncate long mucronate, fig. gls. 1-2 longer, rachilla produced beyond the upper, paleæ 2 not keeled.

SINGAPORE, Ridley & Foilding.

Leaves smooth above except the marginal nerves, scaberulous beneath, base rounded, petiole short broad, midrib slender, nerves 10-12 pairs; sheath short, smooth, striate, callus narrow. Spike or spicate panicle 3-4 in., terminating a leafy branchlet; heads subdistichous, bracteate; bracts with imperfect blades, ovate, truncate, fimbriate. Spikelets several sterile, few fertile; outer palea narrow, convolute, bimucronate, tip hairy, inner shorter tip rounded glabrous. Lodicules 6-10, many-nerved, entire or forked. Stamens 6, 3 longer obtuse, 3 shorter acute. Ovary linear; style long embraced by the enlarged perigynium, stigma plumose.

Flowers unknown.

7. O. setigera, Gamble Bamb. Brit. Ind. 128, t. 115; stem-sheaths papery sparsely strigose narrowed to a truncate top, blade subulate hairlike, leaves 6-9 by 3-14 in. oblanceolate acuminate puberulous beneath, sheath smooth, auricles decurrent, ligule very narrow erose.

NILGHIRI HILLS; ravines above Gudalur, alt. about 3000 ft., Gamble.

A small tufted erect or straggling reed-like Bamboo. Stem 20 ft. by \(\frac{1}{2} \) in. diam., naked below, nodes hardly swollen; internodes 10-12 in., very smooth, walls \(\frac{1}{10} \)—in. thick. Stem-sheaths 6-7 in., persistent tessellately wrinkled towards the top, blade \(\frac{2}{3} \)—lin., hairy within, margins incurved, top very narrow; blade \(\frac{2}{3} \)—lin., hairy within, margin incurved. Leaves smooth above, puberulous beneath, tip capillary, midrib narrow, nerves 6-7 pairs, tessellate by pellucid glands; auricles of sheath friuged with long curved bristles

ADDITIONS AND CORRECTIONS TO VOL. VII.

p. 4.	After 41, ABTHBAXON, insert: Spikes solitary, rachis flattened, spikelets of each pair both 2-fld. and bisexual
р. б.	After 52. Germainia, insert: Spike solitary, joints clavate hollow, spikelets secund 2-nate lower 1-fld., upper neuter . 521. Coelarthbon.
"	After 55. ISEILEMA, insert: Spikelets as in Anthistiria but lower in spike not whorled and neuter
**	For Subtribe VI. read Tribe VI.
"	66. Phippeia, see Catabrosa himalaica, p. 311.
p. 6.	After 67. CYATHOPUS, insert: Spikelets compressed, fis. diandrous, gls. 1-nerved, III 2-lobed awned in the sinus 671. WOODROVIA.
"	Subtribes Aireæ and Euaveneæ are distinguished from one another by the very inconstant characters of the rachilla, which in Aira caryophyllea is produced with a minute seta beyond the fl. gl.
,,	After 83. Danthonia, insert: Spikelets of Danthonia, but lodicules 0, style single very long 831. Duthiea.
р. 7.	After 97. Pheagmitis, insert: Rachilla elongute bearded, lateral nerves only of fig. gls. with long silky hairs 971. Neyraudia.
"	103. CATABROSA. This genus includes 66. Phippsia and 119. Colpodium, the position of which latter it should occupy on p. 8.
p. 8.	The characters of 105. MYRIOSTACHYS and 106. HALOPYRUM are partly transposed and erroneous; read: Infl. pyramidal dense-fid., empty gls. long- awned, grain ovoid Infl. a lax panicle, empty gls. not awned, I 3- nerved, grain broad deeply concave ventrally 106. HALOPYRUM.
,,	Dele 107. Coelachyrum (see p. 328).
,,	119. Colpodium, see p. 311 under CATABROSA.
,,	For DUTHIEA read DUTHIEA, and transfer to p. 6 after 83. DANTHONIA.
p. 9.	After Elymus, insert: Spikelets 2- or more-fid., empty gls. 0 or minute 131 ¹ . Asperella.
,,,	135. For Thyrsacanthus, read Thyrsostachys.
p. 99.	In character of Zoysia, line 5, dele "nerveless"; line 6, the palea is not always nerveless.

p. 100. Under Coix Lachbyma-Jobi, var. stenocarpa, after Stapf. insert: "in Hook. Io. Pl. t. 1764, in Kew Bulletin (1888) 144." Under var. Ma-yuen, insert as synonym, C. gigantea, Kew Bulletin (1893) 76.

- p. 167. Under habitate for A. fastigiatus, for Berar, read Behar.
- p. 186. For Subgen. VI., read Subgen. VII.
- p. 187. .. VII., .. VIII
- p. 203, line 8 from bottom, for criophorus, read eriophorus.
- p. 272. In generic character of Aira, the rachilla is described as not produced beyond gl. IV, but it is so in A. caryophyllea as a very minute setiform process.
- p. 282. For 84. DUTHIEA, read 831. DUTHIEA.
- p. 311, line 8 from top, for 1, read 10.
 - ,, ,, 14 ,, for augusta, read angusta.
- p. 312, line 9 from top, for Graphaphorum, read Graphephorum.
 - " ,, 13, dele sheaths of innovations . . . to mouth.
 - .. Under 6. C. Wallichii, for 10, read 1.
- p. 357, line 6, Festuca filiformis, Nees, is correctly referred to Tripogon abyssinicus at p. 287.



Orders, suborders, tribes and sections in capital type; genera and species in roman type; synonyms and species incidentally mentioned in italic type.

Vol. Page
Abelia, Br
triflora, Br
Abelmoschus angulosus, W. & A. i. 341 crinitus, Wall , 342 esculentus, W. & A , 343 ficulneus, W. & A , 344 ficulneus, W. & A , 344 moschatus, Mœnch , 342 rugosus, W. & A , 342 regosus, W. & A , 342 rego
crinitus, Wall. 342 Wheleri (Wheeleri), Retz. 375 esculentus, W. & A. 343 343 ABRUS, Linn. ii. 175 ficulneus, W. & A. 342 fruticulosus, Bl. 175 moschatus, Moench 342 fruticulosus, Wall. 176 racemosus, Wall. 342 lævigatus, E. Meyer. 175 rugosus, W. & A. 342 melanospermus, Hassk. 175 tetraphyllus, Grah. 341 melanospermus, Hassk. 175 pauciforus, Desv. 175 pauciforus, Desv. 175 Aberis, Hochst. i. 195 precatorius, Linn. 175 Abies, Juss. v. 654 bishintium vulgare, Gærtn. 11328 Abies, Juss. v. 654 bidum, Webb & Borth. 328 densa, Griff. 654 asiaticum, G. Don 328 densa, Griff. 654 asiaticum, W. & A. 328 dumosa, Loud. 654 asiaticum, W. & A. 328 dumosa, Loud. 654 avritum, Wall. 328 Frindrow, Spach 655 fruitosum, G. Don 327 bidentatum, Ho
ABRUS, Linn.
ficulnous, W. & A
racemosus, Wall 342 rugosus, W. & A 342 tetraphyllus, Grah 341 warreensis, Dalz 341 Aberis, Hochst i. 195 Gardneri, Clos v. 654 Brunoniana, Lindl , 654 Dammara, Poir , 650 densa, Griff , 654 Deodara, Lindl , 654 dunosa, Loud , 654 Griffthiana, Lindl. & Gord. , 655 Pindrow, Spach , 655 Smithiana, Forbes , 655 Smithiana, Forbes , 654 Spinulosa, Griff , 654 spectabilis, Spach , 654 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff ,
rugosus, W. & A , 342 tetraphyllus, Grah , 341 warreensis, Dalz , 341 Aberis, Hochst i 195 Gardneri, Clos , 195 Brunoniana, Lindl , 654 Dammara, Poir , 650 densa, Griff , 654 Deodara, Lindl , 655 denso, Loud , 654 Griffthiana, Lindl. & Gord. , 655 Smithiana, Forbes , 655 Smithiana, Forbes , 655 Smithiana, Griff , 655 Smithiana, Forbes , 655 Smithiana, Griff , 655 Smithiana, Griff , 654 Smithiana, Forbes , 655 Smithiana, Griff , 654 Spectabilis, Spach , 654 spectabilis, Spach , 654 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 glaucum, G. Don , 326 spinulosa, Griff , 654 spinulosa, Griff , 655 glaucum, G. Don , 327 fruticosum, Guill. & Perr. , 328 glaucum, G. Don , 327 fruticosum, G. Don , 327 fruticosum, G. Don , 327 fruticosum, G. Don , 327 spinulosa, Griff , 654
telraphyllus, Grah , , 341 warreensis, Dalz , 341 Aberia, Hochst i. 195 Gardneri, Clos , 195 Abies, Jass v. 654 Brunomiana, Lindl , 654 Dammara, Poir , 654 Deodara, Lindl , 654 Deodara, Lindl , 654 Deodara, Lindl , 654 Deodara, Lindl , 654 Griffthiana, Lindl. & Gord. , 655 Brithiana, Forbes , 655 Smithiana, Forbes , 654 spectabilis, Spach , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulos
warreensis, Dalz. ,, 341 pauciforus, Desv. ,, 175 Aberis, Hochet. i. 195 precatorius, Linn. , 175 Abies, Juss. v. 654 Abinthium vulgare, Gertn. , 175 Brunomana, Lindl. ,, 654 Abutilon, Gartn. i. 328 Brunomana, Poir. ,, 654 Abutilon, Gartn. ii. 328 Deodara, Griff. ,, 654 asiaticum, W. & A. , 326 dumosa, Loud. ,, 654 auritum, W. & A. , 326 Griffthiana, Lindl. & Gord. , 655 Avicennes, Gertn. ,, 328 Frindrow, Spach ,, 655 bidentatum, Hochst. ,, 326 Spectabilis, Spach ,, 654 fruticosum, G. Don ,, 327 Spinulosa, Griff. ,, 654 glaucum, G. Don ,, 327
Aberia, Hochst i. 195 Gardneri, Clos , 195 Abies, Juss v. 654 Brunoniana, Lindl , 654 Dammara, Poir , 650 densa, Griff , 655 dunosa, Loud , 654 Griffthiana, Lindl. & Gord. , 655 Pindrow, Spach , 655 Smithiana, Forbes , 655 Smithiana, Forbes , 655 spectabilis, Spach , 654 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 658 spinulosa, Griff , 658 spinulosa, Griff , 658
Gardneri, Clos.
Abies, Juss v. 654 Brunomiana, Lindl , 654 Dammara, Poir , 659 densa, Griff , 659 Deodara, Lindl , 659 dumosa, Loud , 659 dumosa, Loud , 659 Griffithiana, Lindl. & Gord. , 655 Brithiana, Forbes , 655 Smithiana, Forbes , 655 Spectabilis, Spach , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 655 spinulosa, Griff , 654 spinulosa, Griff , 654 spinulosa, Griff , 654
Brunosiana, Lindl , 654 Abutilon, Gartn i. 325 albidum, Webb & Berth 326 albidum, Webb & Berth 326 asiaticum, G. Don , 326 asiaticum, W. & A 326 asiaticum, W. & A 326 auritum, Wall 328 auritum, Wall 328 Avicennes, Gartn 327 bidentatum, Hochst 326 spinulosa, Griff , 654 fruticosum, G. Don 327 spectabilis, Spach , 654 glaucum, G. Don , 328 glaucum, G. Don , 329 glaucum, G. Don , 3
Dammara, Poir.
densa, Griff. ,, 654 asiaticum, G. Don ,, 326 Deodara, Lindl. ,, 653 asiaticum, W. & A. ,, 326 dumosa, Loud. , 654 auritum, Wall. ,, 328 Griffthiana, Lindl. & Gord. ,, 655 Avicennes, Gertn. ,, 327 Smithiana, Forbes ,, 653 orispum, G. Don ,, 327 spectabilis, Spach ,, 654 fruticosum, Gill. & Perr. ,, 328 spinulosa, Griff. ,, 653 glaucum, G. Don ,, 327 Thebica, Lindl. & Gord. ,, 653 glaucum, G. Don ,, 328
Deodara, Lindl. , 653 asiaticum, W. & A , 328 dumosa, Loud. , 654 auritum, W. & A , 328 Griffithiana, Lindl. & Gord. , 655 Avicennes, Gærtn. , 327 Findrow, Spech , 655 bidentatum, Hochst. , 326 Smithiana, Forbes , 653 orispum, G. Don , 327 spectabilis, Spech , 654 fruticosum, Guill. & Perr. , 328 spinulosa, Griff , 654 glaucum, G. Don , 327 Avisional Research , 328 glaucum, G. Don , 327
dumosa, Loud
Griffithiana, Lindl. & Gord. ,, 655 Avicennes, Gærtn ,, 827 Pindrow, Spach ,, 655 55 Smithiana, Forbes ,, 653 654 spectabilis, Spach ,, 654 654 spinulosa, Griff ,, 658 glaucum, G. Don ,, 327 Training , 658 glaucum, G. Don ,, 327 Training , 654 glaucum, G. Don ,, 327
Pindrow, Spach , 655 bidentatum, Hochst. , 326 Smithiana, Forbes , 653 crispum, G. Don , 327 spectabilis, Spach , 654 fruticosum, Guill. & Perr. , 328 spinulosa, Griff , 653 glaucum, G. Don , 327
Smithiana, Forbes , 653 orispum, G. Don , 327 spectabilis, Spach , 654 fruticosum, Guill. & Perr. , 328 spinulosa, Griff , 653 glaucum, G. Don , 327 The control of
spectabilis, Spach , 654 fruticosum, Guill. & Perr. , 328 spinulosa, Griff , 653 glaucum, G. Don , 327
spinulosa, Griff ,, 653 glaucum, G. Don ,, 327
Walking I in J7 CEA COMPANIE W & A 997
ABIETINEE v. 644 hirtum, G. Don ,, 327
Abildgaardia, Vahl vi. 649 hirtum, W. & A , 327
cinnamometorum, Thw ,, 650 indicum, G. Don ,, 326
compressa, Presl ,, 649 Leschenaultianum, G. Don ,, 325
cyperoides, Nees ,, 650 microphyllum, A. Rich ,, 328
Eragrostis, Boeck ,, 648 muticum, G. Don ,, 327
fulvescens, Thw ,, 650 neilgherrense, Munro ,, 328
fusca, Nees , 649 periplocifolium, G. Don , 325
indica, Nees ,, 649 polyandrum (Schlecht), G.
lævigata, Link ,, 649 Don ,, 325
monostachya, Vahl 649 populifolium, G. Don , 326
nervosa, Presl ,, 634 ramosum, Guill. & Perr. ,, 328
pauciflora, Kunth ,, 649 sidoides, Dalz. & Gibs ,, 328
Rottboelliana, Nees , 649 tomentosum, W. & A , 327
tristachya, Vahl ,, 649 Abutua (Abatua) indica, Lour. v. 648
sp., Wall ii. 292

The contents of this Index have been collated with the Index Kewensis.

Acacia	Vol.	Page	Acacia	,	Vol. 1	Page
alba, Willd	22	294	odoratissima, Willd.	•••	ii.	299
alliacea, Ham		297	oxyphylla, Grah	•••	,,	297
amara, Willd		801	paludosa, Miq	•••	"	297
amblycarpa, Grah		298	pennata, Willd		"	297
arabica, Willd		293	pinnata, Dalz. & Gibs.		,,	297
Arar, Ham		297	planifrons, W. & A.		"	293
arcuata, Done	-	294	pluricapitata, Steud.		,,	298
Arrophula, D. Don		298	polyacantha, Willd		,,	295
biceps, DC	•	290	polycephala, Grah	•••	"	298
cæsia, W. & A		297	prensans, Lowe	•••	39	297
cæsia, Wall	•••	298	procera, Willd	•••	"	299
Campbelli, Arn	• • •	293	Pseudo-intsia, Miq	•••	"	297
canescens, Grah		298	Rowburghii, W. & A.	•••	,,	293
Caringa, Ham	,,	290	rugata, Ham		,,	297
Catechu, Willd		295	rupestris, Stocks	•••	,,	295
Catechu, Brand		295	Senegal, Willd	•••	,,	295
Catechu, W. & A		294	Sirissa, Ham		"	298
catechuoides, Wall		295	speciosa, Willd	•••	"	298
chrysocoma, Miq	•	294	Smithiana, Wall	•••		300
OL 3 Will 3	•••	295	stipulata, DC		,,	300
· 6		288	Come Varia		"	294
TO 0		2 96	Suma, NW72 Sundra, DC	•••	"	295
	•	298	Sundra, Wall		"	294
Dale Dam		288	tomentella, Zipp	•••	"	298
1 11 A T 1	••	292		•••	"	294
		294		•••	"	296
densa, Wall		296	umbraculata, Wall vera, Willd	•••	"	293
dumosa, W. & A eburnea, Willd		293	Verek, Guill. & Perr.	•••	"	295
1 1 71 - 1		299	777 111 1 1 10 01	•••	"	295
elata, Grah		292		•••	"	298
Farnesiana, Willd	•	293	Wightii, Baker	•••	ii.	61
Farnesiana, Wall	"		ACACIEE	•••		414
ferruginea, DC		295 301	Acalypha, Linn	•••	₹.	417
foliolosa, Grah	• • •	290	albicans, Heyne	•••	"	415
frondosa, Willd		290 290	alnifolia, Klein	•••	"	415
glauca, DC		296	amentacea, Roxb	•••	"	397
Hooperiana, Zippel		290 292	atropurpurea, Wall.	•••	"	415
indica, Desv			betulina, Retz	•••	"	417
Intsia, Willd	. ,,	297	boehmerioides, Miq	•••	"	416
intsioides, DC	•	297	brachystachya, Horne	m	22	
Jacquemontii, Benth	• ,,	293	calyciformis, Wight	•••	,,	416 416
Julibrissin, Willd	. ,,	300	canescens, Wall capitata, Wall capitata, Willd	•••	"	
Latronum, Willd	٠,,	296	capitata, Wall	•••	"	415
Lebbek, Willd	٠ ,,	298	capitata, Willa	•••	"	415
lenticularis, Ham	. ,,	296	oiliata, Forsk	•••	"	417
leucocepala, DC	. ,,	290	ciliata, Heyne	•••	,,	417
leucophlæa, Willd	. ,,	294	ciliata, Wall	•••`	"	416
lomatocarpa, DC	. ,,	299	collina, Heyne	•••	"	417
marginata, Ham	. ,,	300	conferta, Roxb	•••	"	416
megaladena, Desv	. ,,	297	corchorifolia, Vahl	•••	"	417
melanowylon, Br	. ,,	292	cylindrica, Roxb	•••	,,	417
microcephala, Grah	. ,,	294	Dalzellii, Hk. f	•••	**	414
modesta, Wall	. ,,	296	fallax, Muell	•••	99	416
mollis, Wall	. ,,	300	filiformis, Heyne	•••	"	415
myriophylla, Grah	. ,,	301	fimbriata, Schum	•••	99	417
Nellyrenza, Grah		301	fissa, Hb. Madr	•••	,,	416
Nemu, Willd	. ,,	300	flewuosa, Wight	•••	,,	417
nitida, Willd	. ,,	303	floribunda, Heyne	•••	,,	417

Acclumba		_			_
		Page	Acanthus		Page
2	٧.	415 417	leucostachyus, Wall	i∀.	480
	"	416	longibracteatus, Kurz	"	482 480
1. (/ J VIII). A	"		longipetiolatus, Kurz	"	
im diam Time	"	417	maderaspatensis, Linn	"	479
	"	416	mucronatus, Heyne	"	617
	"	417	repens, Vahl	,,	479
	"	417	volubilis, Wall	"	481
	,,	416	Accras, vide Aceras.		200
	,,	415	Acer, Tournef	i.	692
	,,	417	acuminatum, Wall	"	695
	"	415	Buzimpala, Ham	"	693
rubra, Wight	,,	417	oæsium, Wall	,,,	695
spicata, Forsk	,,	416	Campbellii, Ilk. f. & T	,,	696
	,,	417	caudatum, Wall	,,	695
virginiana, Russell	,,	417	colchicum, Hort	"	696
Wallichiana, Thw	,,	415	cultratum, Wall	,,	6 96
Wightiana, Muell	,,	417	Hookeri, Miq	,,	694
Acampe, Lindl vi.	54,	179	isolobum, Kurz	,,	694
	vi.	63	javanicum, Jungh	,,	693
congesta. Lindl	,,	63	latum, C. A. Mey	"	696
dentata, Lindl	,, 6	2,66	lævigatum, Wall	"	693
amaguata Timal	,,	63	laurifolium, D. Don	"	69 3
Griffithii, Rchb. f	,,	66	laurinum, Hassk	,,	69 3
	,,	66	Mono, Maxim	,,	696
9 1	,,	62	niveum, Bl	,,	693
9111 a T im all	,,	62	oblongum, Wall	422	693
	,,	63	pectinatum, Wall		695
	-	62	pentapomicum, J. L. Stew.	"	694
	" V.	428,	pictum, Thunb	,,	696
448, 459, 473, 4			platanifolium, Griff	"	695
ACANTHACEÆ ii		387	sikkimense, Miq		694
ACANTHEÆ i		389	stachyophyllum, Hiern	"	694
	v.	815	sterculiaceum, Griff	"	696
Li., 1 7: 31		815	sterculiaceum, Wall	"	695
	,,	815	Thomsoni, Miq	,"	695
- A 7 . A 7	,,	816	truncatum, Bunge	-	696
multiplem no Timell	"	815	villorum, Wall	"	695
	"	479	Aceras (Aceras) angustifolia,	**	000
'amiantum Dolila		479	Lindl	vi.	129
	ij.	479	longicruris, Wright lapsu, H.	"	129
lancamadiaidan Daine		479	ACERINEÆ	ï.	669
£7. £7 TT1. € € M	"	479	Achasma, Griff	vi.	234
	,,				235.
	ii.	726	macrocheilos, Griff megalocheilos, Griff	19	236
• •		726		,,	234
	,,	726	1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	iii.	311
	"	216	1		312
	1.	216		"	312
	"			"	312
	v.	480 480	squarrosa, Ait	."	274
	,,		Achimenes sesamoides, Vahl		
	,	479	Achnodon arenarius, Link		
Delilei, Spreng	,,	479	Achnodonton arenarium, Trin.		
	,,	481	Achras elengoides, Bedd		538
	••	481	Sapota, Linn	,,	534
*** ** * *	"	479	tomentosa, Bedd	"	538
))	481	Achymus pallens (patens),		400
ilicifolius. Lour	••	4 81	Boland	٧.	±03

	1	Vol.	Page	Achyranthes	1	Vol. 1	age
Achyranthes, Linn		i▼.	729	4 i . 1	•••		781
alopecuroides, Lamk.	•••	"	727		•••	,,,	73 0
alternifolia, Linn	•••	"	718		•••		728
$\mathbf{a}\mathbf{quatioa},\ Br. \dots \dots$	•••	,,	780	Wightiana, Wall	•••	,,	781
largentea, Thw	•••	93	780	Achyrospermum, Bl	•••		673
aspera, Linn	•••	"	730	densiflorum, Bl	•••	,,	673
aspera, Wall	•••	31	731	philippinense, Benth.	••	. ,,	673
atropurpurea, Lamk.	•••	,,	723	Wallichianum, Benth.	•••	,,	673
bengalensis, Lamk	•••	,,	781	Acianthus petiolatus, D. Do	n	- 11	693
bidentata, $Bl. \dots \dots$	•••	"	780	Acilepis lanata, Spreng.			387
brachista, Linn	•••	,,	726	squarrosa, D. Don	•••	,,	280
calceolata, Hb. Russel	•••	,,	725	Aclisia elegans, Hasak.	•••		868
Pearnosa, Wall	•••	,,	725		•••	"	368
corymbosa, Linn	•••	i.	245	indica, Wight	•••	"	868
debilie, Poir	•••	iv.	728		•••	99	367
diandra, Rosb	•••	,,	731	? Thomsoni, Clarke	•••	,,	876
Digera, Poir	•••	,,	718	umbellata, Clarke	•••	"	368
eckinata, Retz	•••	,,	724	sp. Hk. f. & T i	ii. E	367,	868 .
echinata, Willd	•••	"	724	Acmella biflora, Spreng.	•••	iii.	806
ferruginea, Roxb	•••	"	725	7	•••	,,	307
javanica, Pers	•••	,,	727	Acmena lanceolata, Thw.		ii.	485
glauca, Hb. Heyne	•••	"	725	parviflora, DC		"	485
incana, Roxb	•••	"	727	zeylanica, Thwaites	•••	"	485
lanata, Linn	•••	"	728		•••	i.	27
lanceolata, Wall	•••	"	731	Atees, Royle	•••	"	29
lappacea, Linn	iv.	723,	724	cordatum, Royle	•••))	29
lappacea, Willd	•••	iv.	724	delphinifolium	•••	33	29
Monsonia, Pers	•••	91	729	dissectum, D. Don	•••	"	29
montana, Klein	•••	"	725	ferox. Wall		"	28
Moorcroftiana, Br	•••	v.	8		•••	"	29
muricata, Willd	•••	iv.	718	1 - 4 1 - 11 777 - 11	•••	27	29
natans, Ham	•••	,,	730	læve, Royle	•••	"	28
nervosa, Roth	•••	"	729	lethale, Griff	•••	"	28
nodiflora, Roxb	•••	"	717	1 177. P 0. M	•••	39	28
nuda, Hb. Heyne	•••	,,	725	Taranakamana Tara	•••	"	28
orbiculata, Heyne	•••	"	724		•••	31	29
papposa, Jacq	•••	v.	8	37 11 T	•••	"	28
patula, Linn	•••	iv.	724	.1'	•••	"	29
patula, Willd	•••	,,	724	1 - 1	•••	"	28
polygonata, Heyne	•••	"	716	rotundifolium, Kar. & K		99	29
polygonoides, Retz	•••	"	718	tianschanicum, Osk. & Ru	ıpr.	,,	29
porphyristachya, Wall.		,,	730	uncinatum, Linn		,,	28
prostrata, Linn	•••	99	723	variegatum, Hk. f. & T.	•••	"	28
pubescens, Roth	•••	"	729	virosum, D. Don	•••	99	28
pungens, Lamk	•••	"	729	Acorus, Linn	•••	vi.	555
radicans, Heyne	•••	"	72 9	Belangeri, Schott		"	555
repens, Heyne	•••	"	728	Calamus, Linn	٠.,	"	555
rotundifolia, Klein	•••	29	724	Calamus, Benth		"	556
rubro-fusca, Wight sarmentosa, Vahl	•••	"	780	Casia, Bertol	•••	,,	555
sarmentosa, Vahl	•••	"	731	gramineus, Soland	•••	"	556
scandens, Roxb	•••	"	727	Griffithii, Schott	•••	"	555
Sequax, Wall sericea, Koen	•••	"	722	nilaghirensis, Schott	•••	"	555
sericea, Koen		"	726	Tatarinovii, Schott	•••	19	556
setacea, Roth		"	729	terrestris, Sprang	•••	11	556
styracifolia, Lamk		"	724	Acosmia rupestris, Benth.		i.	217
thyrsiflora, Heyne		,,	716	Acranthera, Arn	•••	· iii.	92
tomentosa, Roth	•••	,,	722	anamallica, Bedd	•••	22	98
•						••	

A 43						
Acranthera		Page	Antona Timu		Vọl.	Page 29
grandiflora, Bedd	iii.		Actesa, Linn	•••	1.	29
Griffithii, Hk. f	"	92	acuminata, Wall	•••	"	29
Maingayi, Hk. f	***	92	cimicifuga, Linn	•••	,,	30
tomentosa, Hk. f	,,,	92	frigida, Wall	•••	,,	30
uniflora, Kurz	,,	86	spicata, Linn	•••	."	29
zeylanica, Arn	19	92	Actegeton sarmentosa, Bl.	•••	iii.	620
Acratherum fuscatum, Nees	vii.		Actophila, Blume	•••	٧.	282
miliaceum, Link	"	73	bantamensis, Miq	• • •	.,,,	283
pumilum, Hochst	,,	71	excelsa, Muell	▼.	282,	
ACRIDOSTACHYA, Hk. f	₹.	786	javanica, Miq	•••	v.	283
Acriopsis, Reinwdt	Ţi.	79	neilgherrensis, Thw.	•••	,,	283
crispa, Griff	,,	79	neilgherrensis, Wight	•••	,,	282
Griffithii, Rohb. f	,,	79	puberula, Kurz	•••	,,	283
indica, Wight	,,	79	rectinervis, Kurz	•••	,,	473
javanica, Reinwdt	,,	79	Thomsoni, Muell	•••	,,	283
picta, Lindl	,,,	79	zeylanica, Muell	•••	"	283
Ridleyi, <i>Hk. f.</i>	,,,	79	Actinia sp., Griff	•••	٧.	718
Acrocarpus, W. & A		292	Actinidia, Lindl		i.	285
Acrocarpus, W. & A combretifiorus, Teysm. d	;		callosa, Lindl		,,	286
Binn	,,	292	Kolomikta, Rupr		,,	286
frazinifolius, Wight		292	strigosa, Hk. f. & T.		"	286
Acrocephalus, Benth	iv.	611	Actinocarya, Benth	•••	iv.	154
axillaris, Benth	,,	612	tibetica, Benth	•••	,,	155
Blumei, Benth	"	611	Actinodaphne, Nees	•••	Ÿ.	147
capitatus, Benth	"	611	ambigua, Hk. f	•••	,,	153
scariosus, Wall	"	611	angustifolia, Nees		٠,,	152
Acrochene, Lindl	٧.	783	angustifolia, Nees ?		"	149
punctata, Lindl		783	Blumii, Nees	•••	-	160
Acroelytrum japonicum,	"		campanulata, $Hk. f.$	•••	"	148
G13	vii.	3 31	Candolleana, Meissn.	•••	"	153
Acroglochin, Schrad	٧.	2	concolor, Nees	•••		148
chenopodioides, Schr		2	confertiflora, Meissn.		"	154
persicarioides, Moq	"	2	elegans, Thw	•••	"	150
Schraderianus, Schult	"	2	glauca, Nees)9	150
Acronema tenerum, Edgew.	ii.	686		•:•		151
TTL # B M		686	P heterophylla, Bl	•••	"	152
4	i.	408	hirsuta, Hk. f	•••	"	152
	i.	498	fr 2 1 25 2 2	•••	,,	149
		498		•••	,,	149
laurifolia, Bl pedunculata, Miq	"	498		•••	,,	149
	37	498	7 1 12 772 4		154,	
Porteri, Hk. f	,,	32			-	~ ~
Acrotrema, Jack	i.	32	leiophylla, Hk. f	•••		152
Arnottianum, Wight	,,	33	macroptera, Miq	•••	"	149
bullatum, Thw	19	82	madraspatana, Bedd.	•••	"	151
costatum, Jack	"	82	Maingayi, Hk. f	•••		
costatum, Wall	"		malaccensis, Hk. f	•••	,,	148
dissectum, Thw	"	34	molochina, Nees	•••		150
Gardneri, Thw	"	83	Moonii, Thw	•••	"	150
intermedium, Thw	"	33	obovata, Bl	•••	,,	153
lanceolatum, Hook	,,	33	pisifera, Hk . f	•••	,,	151
lyratum, Thw	,,	34	pruinosa, Nees	•••	,,	152
sylvaticum, Thw	,,	33	reticulata, Meissn	•••	,,	147
Thwaitesii, Hk. f. & T	,,	34	Balicina, Meissn	•••	,,	148
uniflorum, Hook	>>	33	salicina, Bedd	<u></u>	"	149
Walkeri, Wight	. ,,	83	sesquipedalis, Hk. f. &	T.	,,	151
Wightianum, W. & A	r	32	sikkimensis, Meisan.		,,	147
Wightianum, Wall	,,	32	speciosa, Nees			153

Actinodaphne	Vol.	Page	Adenosma	Vol.	Page
sphærocarpa, Nees	▼	154	cœruleum, Br	. i▼.	263
stenophylla, Thw	,,	150	cuspidatum, Benth	"	262
Thwaitesii, Meissn	,,	150	macrophyllum, Benth	"	264
Actinoschænus filiformis,			malabaricum, Hk. f	"	264
Benth	vi.	650	microcephalum, Hk. f	"	264
sp., Benth	.;;	651	ovatum, Benth	••	263
Actinostemma, Griff	ii.	632	subrepens, Benth	37	263
tenerum, Griff	"	633	triflorum, Seem	"	266 263
Adambea glabra, Lamk	ii.	577	villosum, Benth Adenosma, Nees	"	400
Adamia chinensis, Gardn. &	ii.	406			454
cyanea, Wall		406		"	404
	. "	406	balsamea, Spreng biplicata, Nees	"	405
Adansonia, Linn	", i.	348	elongata, Bl	"	400
digitata, Linn		348	Griffithii, T. Anders	"	404
Adelia barbata, Blanco	٧.	430	lanceolata, Bl	"	398
Bernardia, Blanco	•••	430	pinnatifidum, T. Anders.	"	405
castanicarpa, Roxb	"	460	polysperma, Spreng	"	406
cuneata, Wall	"	456	spatulata, Bl	,,	396
glandulosa, Blanco	",	422	Thwaitesii, T. Anders	,,	405
neriifolia, Roth	"	455	Thymus, Nees	"	404
retusa, Wight	,,	456	triflora, Nees	,,	405
	iv.	20	uliginosa, Necs	,,	403
gracillimum, Hk. f	,,	21	rerticillata, Nees	99	4C4
Adenacanthus acuminatus,			Adenostemma, Forst		242
Nees iv.	431,	455	a n gustifoli u m, Arn	,,	242
Adenanthera, $Linn.$	ii.	287	aquaticum, D. Don	,,	242
aculeata, Roxb	,,	288	elatum, DC	,,	242
bicolor, Moon	"	287	erectum, DC	,,	243
pavonina, Linn	,, '	287	fastigiatum, DC	,,	243
Adenema hyssopifolium, G.			fastigiatum, Sch. Bip	,,	243
Don	iv.	101	glandulosum, Benth. vide		
Adenilema fallar, Bl., ii. Adde		200	Odontostemma	i.	242
Adenocaulon, Hook	iii.	302	latifolium, DC		242
adhærescens, Max	,,	302	latifolium, Wight	040	243
bicolor, Hook	"	302		242,	
himalaicum, Edgew	••	302 417		iii.	242
Adenochlæna, Baill	v.	418	madurense, DC microcephalum, DC	,,	243 242
1 1 5 5 5 5	,,	419	l "ta" má	• • •	242
• • • • • • • • • • • • • • • • • • • •	,,	418	Total Control Total		243
zeylanica, Thw	"	419			242
Adenocrepis lanceolata,	"	120		"	242
~	v.	368	Roylei, DC rugosum, DC	"	243
	iii.	310	viscosum, Forst	٠,	242
P Adenoncos virens, Bl	vi.	77	D.C.	·),	243
Adenoon, Dalz	iii.	229	Adenostylis emarginata, Bl.	vi.	107
indicum, Dalz	,,	229	integerrima, Bl	"	107
	iii.	95	Adhatoda, Nees	iŸ.	540
Lawii, Hk. f	,,	96	arenaria, Nees	,,	526
longifolia, Wall	,,	95	argyrostachya, Nees	"	527
macrostachya, Hk. f	,,	96	Beddomei, Clarke	"	540
malayana, Wall	,,	95	Betonica, Nees	,,	525
stipulata, Hk. f	,,	95	ceylanica, Nees	"	5 2 9
Adenosma, Br	iv.	263	decussata, Nees	,,	532
camphoratum, Hk. f	"	264	diversiformis, Nees	"	529
capitatum, Benth	,,	264	Hookeriana, Noos	"	532

Adh atoda	Vol	Page	Æ chmandra		Vol. 1	Pago
Neesiana, Nees		531	velutina, Dalz. & Gibs.		ii.	628
nilgherrensis, Nees		526	1 ' 7733			629
nilgherrica, Nees	•••	52 6	Æchmanthera, Necs	•••	iŸ.	428
	••• ,,	529		•••		428
7 14 1 37	,,	530	gossypina, Nees	•••	:)	429
quadrifaria, Nees	,,	525	leiosperma, Clarke	•••	"	428
ramosissima, Neos	,,	546	tomentosa, Necs	•••	"	428
sisparensis, Benth	,,	530	Wallichii, Nees	•••	.;;	
tranquebariensis, Nees	,,		Ægialitis, R. Br	• • •	111.	479
trinervia; Nees	,,	526	annulata, Kurz	•••	"	479
vasculosa, Nees	,,	533	rotundifolia, Roxb	• • • •))	479
Vasica, Necs	,,	540	rotundifolia, Presl	• • •	.?.	479
ventricosa, Neos	,,	526	Ægiceras, Gaertn	•••	111.	533
wynaadensis, Nees	,,	533	corniculatum, Blanc.	•••	"	533
Zollingeriana, Nees	••• ,,	530	ferreum, Bl	•••	11	533
sp., Griff	,,,	540	floridum, R. & S	•••	"	533
	31, 533,		fragrans, Koen	• • •	"	533
Adina, Salisb	iii.	24	majus, Gaertu	• • •	,,	533
oordifolia, Hk. f	,,	24	Malaspinea, A. DC	• • •	;;	533
Griffithii, Hk . f	,,	24	minus, A. DC	•••	,,	533
polycephala, Benth	,,	25	nigricans, A. Rich	• • •	,,	533
sessilifolia, $Hk. f.$;,	24	obovatum, Bl		22.	533
Adinandra, Jack	1.	281	Ægilops ciliaris, Koen.	• • •	VII.	367
acuminata, Korth	,,	282	ciliaris, Koon	• • •	13	140
crenulata, T. Anders	,,	283	cordata, Linn	• • •	"	367
cyrtopoda, Miq	,,	282	cuneata, Roxb	•••	"	158
dasyantha, Chois	,,	282	cylindrica, C. A. Moy.		"	367
dumosa, Jack	,,	282	exaltata, Linn	•••	,,	160
glabra, Miq	,,	282	muricata, Retz	• • •	11	140
Griffithii, Dyer	,,	282	saccharina, Walt	• • •	,,	296
integerrima, T. Anders.	,,	282	sanguinea, Linn	• • •	"	154
Jackiana, Korth	,,	282	squarrosa, Linn	•••	"	367
lasiopetala, Chois	,,	283	Tauschii, Coss	•••	.11	367
maculosa, T. Anders	••• ,,	282	Æginetia, Linn	•••	iv.	320
stylosa, Miq	,,	282	abbreviata, Ilam	;:-	"	320
trichocoryna, Korth.	,,	282	acaulis, Walp		320,	
villosa, Chois	,,	283	indica, Roxb	•••		320
Adisca floribunda, Bl	v.	432	pedunoulata, Wall	•••:	"	320
subpeltata, Bl	••• 11	433	Ægle, Corr	•••	1.	516
Zippelii, Bl	;	430	Marmelos, Corr	• • • •	"	516
Adonis, Linn	1.	15 15	Æluropus, Trin	•••	vii.	334
æstivalis, Linn	,,	15	arabicus, Steud	•••	"	295
autumnalis	,,	15	brevifolius, Nees	•••	"	334
chrysocyathus, Hk. f. &		15	brevifolius, Wall.	• • • •	"	334
Inglisii, Royle	,,	15	concinnus, Fig. & Notar		295,	_
marginata, Bienert	,,	15	lagopodioides, Triv		vii.	
pyrenaica, Hk. f. & T.	,,	15				334
scrobiculata, Boiss	;; iii.	10	mucronatus, Aschers.	•••	11	334
Adoxa, Linn		2	l 194 GL 3	•••	"	334
inodora, Falc moschatellina, Linn.	,,	2	niliacus, Steud niloticus, Edgew	•••	"	334
	,,	37	1	•••	"	295
Echmandra conocarpa, Da		01		•••	"	334
	••	628	1 ~ ~ .	•••	"	334
& Gibs		626	repens, Parl	•••	"	334
deltoidea, Arn	,,	628	siniacus, Fig. & Notar.		"	334
epigæa, Arp indica, Arp	*** ***	626	villosus, Trin		"	334
	*** ***	627	sp., Aitch			328
rostrata, Arn	11	027	1 ob., man	•••	"	-=0

Vol. Page	Ærides	Vol. Page
Aerachne eleusinoides, W. & A. vii. 295	Reichenbachii, Linden retrofractum, Wall	vi. 47
verticillata, Lindl ,, 295	retrofractum, Wall	,, 46
Ærides, Lour vi. 43, 178	retusum, Sw	,, 32
affine, Wall vi. 44	rigidum, Ham	,, 48
amplexicaule, Lindl ,, 40	rigidum, 8m	,, 197
ampullaceum, Roxb ,, 64	Rohanianum, Robb. f.	,, 47
appendiculatum, Wall ,, 67	roseum, Lodd	,, 45
Arachnites, Lindl ,, 41	rostratum, Roxb	,, 36
Arachnites, Sw ,, 28	spicatum, D. Don	,, 32
Ballantinianum, Rohb. f. " 47	suaveolens, Roxb	,, 34
Borassi, Ham ,, 48	suavissimum, <i>Lindl</i> .	,, 47
Borassi, Sm ,, 10	tæniale, Lindl	,, 81
Brookeii, Lindl ,, 46	tessellatum, Wight	,, 52
calceolare, Sm ,, 60	testaceum, Lindl	,, 50
carnosum, Griff ,, 32	trigonum, Klotz	,, 45
cornutum, Roxb ,, 47	umbellatum, Wall	,, 61
orassifolium, Par. & Rchb.f. ,, 46	undulatum, Sm	,, 63
crispum, Lindl ,, 45	Vandarum, Rchb. f	,, 44
cristatum, Wall ,, 53	Veitchii, Hort	,, 45
cylindricum, Lindl vi. 44, 196	viridiflorum, Thw	vi. 38, 196
cylindricum, Hook vi. 44	Warneri, Hort	vi. 46
cylindricum, Linn ,, 198	Wightianum, Lindl	" 50
dasypogon, Sm ,, 66	Williamsi, Warn	,, 45
decumbens, Griff ,, 48	sp., Griff	,, 53
densiflorum, Wall ,, 72	Erobion carinatum, Spren	g. vi. 1, 195
difforme, Wall ,, 76	Ærua, Forsk	iv. 727
Emericii, Rchb. f 47	ægyptiaca, Gmel	,, 727
expansum, Rchb. f ,, 46	Bovii, Edgew	, 727
falcatum, Lindl ,, 46	brachiata, Mart	,, 726
Fieldingii, Lodd ,, 45	chenopodiifolia, Bojer	,, 726
flavidum, Lindl ,, 47	floribunda, Wight	,, 728
guttatum, Roxb ,, 32	glabrata, Hk . f	,, 728
Hystrix, Lindl ,,39, 76	incana, Mart	,, 727
illustre, Rohb. f ,, 45	javanica, Juss	,, 727
Larpentæ, Hort " 46	lanata, Juss	,, 728
lasiopetalum, Willd ,, 48	Monsonia, Mart	,, 728
latifolium, Thw ,, 32	? nervosa, Mart	,, 729
leopardorum, Wall ,, 60	pubescens, Mart	, 729
lepidum, Rchb. f ,, 48	radicans, Mart	,, 729
Lindleyanum, Wight ,, 45	sanguinolenta, Bl	,, 728
lineare, $Hk. f. \dots \dots , 47$	scandens, Wall	,, 727
Lobbii, Hort ,, 45	scandens, Gamble	,, 729
longicornu, $Hk. f. \dots , 44$? setacea, Mart	,, 729
maculatum, Sm ,, 51	timorensis, Moq	,, 728
maculosum, Lindl ,, 45	tomentosa, Forsk	, 727
Mendelii, Jonn , 48	velutina, Moq	i v . 724, 728
mitratum, Rchb. f ,, 44	Wallichii, Moq	iv. 727
multiflorum, Roxb ,, 44	Wightii, $Hk. f$,, 728
nobile, Warn ,, 47	Æschynanthoidea, Griff.	iv. 342
odoratum, Lour ,, 47	Æschynanthus, Jack	iv. 337
pachyphyllum, Rchb. f ,, 48	acuminata, Wall	,, 341
pallidum, Boxb ,, 86	acuminata, G. Don	,, 859
præmorsum, Willd ,, 32	Andersoni, Clarke	,, 841
racemiferum, Wall ,, 68	bracteata, Wall	,, 842
radiatum, Roxb v. 774	bracteata, Benth	,, 341
radicosum, A. Rich vi. 46	ceylanica, Gardn	,, 340
ramosum, Wall ,, 72	ceylanica, Wight	,, 340

	-					
		Page	Æschynomene	1		Page
chinensis, Gard. & Champ.	ív.	841	viscidula, Willd	•••	ii.	151
chiritoides, Clarke	"	341	Asculus, Linn asamicus, Griff	•••	i.	675
conferta, Griff	"	844	asamicus, Griff		,,	675
fulgens, Wall	"	888	Hippocastanum, Linn.	•••	,,	675
gracilis, Parish	,,	340	indica, Hiern		"	675
grandiflora, Spreng	"	338	punduana, Hiern		,,	675
Muldial: Du		339	Etheilema mucronatum,?		F. ïv	
TToolson! Olanka	"	338	parviforum, Spreng.	.:.		417
771	"	342			,"	
	"	341			•,,	417
levipes, Clarke	"	343	sp., Griff	•••	"	114
Lobbiana, Hook	"		Ætheria, Endl	••••		
longicaulis, Wall	"	337	fusca, Lindl			, 112
longiflora, Wall	"	342	mollis, Lindl	•••		109
maculata, Lindl	"	839	Afzelia, Sm	•••	ii.	
Mannii, Kurz	"	341	bijuga, A. Gray	•••	"	274
Masoniss, Kurz	,,	341	? coriaces, Baker		"	275
micrantha, Clarks	"	340	palembanica, Baker		"	275
obconica, Clarks	"	343	retusa, Kurs			274
parasitica, Clarke	"	338	Agalma æsculifolium, Seer	n.	iï.	738
parasitica, Wall. iv. 338,			elatum, Seem			728
- 4 0 5	iv.	339			"	728
		340	Total American in the control of the	•••	"	728
parviflora, Clarke	"	342		•••	"	729
Partoni, Lindl	"		racemosum, Seem	•••	"	729
Peelii, Hk. f	"	842	fostratum, Seem	•••	"	•
Perrottetii, A. DC	"	339	tomentosum, Seem	•••	.,,	728
Perrottetii, Gardn	"	340	Aganope floribunda, Miq.	••••	ii.	246
radicans, Jack	"	343	Aganosma, G. Don	•••	iii.	663
	339,	343	acuminata, G. Don	•••	"	663
ramosissima, Wall	iv.	339	Blumei, Wight		"	664
superbs. Clarke	"	342	calycina, A. DC		"	664
Wallichii, Br		343	caryophyllata, G. Don		,,	664
Wallichii, Br iv. 338, sp., Griff iv. 338,	339	342	concanensis, Hook			650
sp., Hk. f. & T. iv. 338,	839.	340.	cymosa, G. Don		"	665
op., 112.11 G 11 11 100,		343	1		"	665
Æschynomene, Linn	ii.	151	70	• • • •	"	665
		152		•••	."	6
aspera, Linn	33	151	Edithæ, Hance		i▼.	665
aspera, Wall	"		elegans, G. Don		iii.	
bispinosa, Jacq	"	115	gracilis, Hk. f	•••	"	664
cannabina, Retz	"	115	lævigata, Grah	•••	"	665
coccinea, Desv	"	115	macrocarpa, A. DC	•••	,,	663
coccinea, Linn	"	115	marginata, G. Don	•••	"	663
diffusa, Roxb	"	115	Roxburghii, G. Don	•••	"	665
diffusa, Willd	"	151	Wallichii, G. Don		"	665
grandistora, Linn	"	115	Agapetes, D. Don'	•••	iii.	448
indica, Linn	"	151	acuminata, G. Don	•••	"	455
indica, Burm		114	angulata, Hk. f	•••	"	447
J., 37 327 11	"	152	? arborea, DC			455
	"	151	auriculata, Hk. f		"	444
	"	115	1	•••	"	448
paludosa, Roxb	"	115	1 9 99 99 44	•••	: 99	447
procumbens, Roxb	"			•••	"	
pumila, Linn	"	151	companulata, Clarke	•••	"	449
Romburghii, Spreng	32	151	discolor, Clarke	•••	"	448
Sesban, Linn	"	114	glabra, Clarks	•••	11	444
spinulosa, Boxb	"	115	grandiflora, Hk. f	•••	72	446
surattensis, W. &. A	99	152	Griffithii, Clarke ·	•••	"	449
trachyloba, Miq	"	152	hirsuta, Klotz		"	448
uliginosa, Roxb	",	115	linearifolia, Clarke	•••	"	449

Agapetes	Vol	Page	Aglaia		Vol.	Page
Lobbii, Clarke	***	448	Dookkoo, Griff		i.	558
loranthifolia, D. Don		446	edulis, A. Gray	•••	,,	556
macrantha, Hk. f		446	glabritlora, Hiern		"	555
macrophylla, Clarke	• • •	445	W-11			555
, a, ,		443		•••	"	554
		445		•••	"	555
miniata, Hk. f	•	447	midnaporensis, Carey	•••	"	555
mitrarioides, Ilk. f	••	448			557	
nana, Hk. f		445	minutiflora, Redd		557,	554
Nuttallii, Clarke	, ,,		odorata, Lour	•••	1.	
obovata, $Hk. f. \dots \dots \dots$	"	447	palembanica, Miq	•••	"	557
odontocera, Hk. f	,,,	446	pentaphylla, Kurz	•••	"	554
Parishii, Clarke	, ,,	445	perviridis, Hiern	•••	"	556
pilifera, Hk. f	,,,	448	polyantha, Bedd	•••	"	557
pulcherrima, Ilk. f	, ,,	446	? polystachya, Wall	•••	"	559
salicifolia, Clarke	,,,	445	Roxburghiana, Miq.	•••	"	555
saligna, $Hk. f. \dots \dots \dots$, ,,	444	sexipetala, Griff	•••	"	556
serrata, G. Don	, ,,	452	Sippannas, Miq	•••	"	557
setigera, D. Don	, ,,	443	Spanoghei, Bl		"	555
Sprengelii, G. Don	,,,	453	spectabilis, Hort. Calc.		,,	561
symplocifolia, G. Don	٠,,	455	tenuicaulis, Hiern		,,	556
variegata, D. Don		446	tomentosa, Teysm. & Bi	nn.	,,	557
variegata, DC		443	Wallichii, Hiern	i.	555,	685
variegata, Hk. f		443	sp., Teysm. & Binn.		i.	555
verticillata, D. Don		443	? sp., Wall		"	555
Wallichiana, Klotz		443	Aglaodorum Griffithii, Sch		vi.	528
Agasta, Miers	- 22	507	Aglaonema, Schott		vi.	528
asiatica, Miers		507	birmanicum, IIk. f		"	529
indica, Miers		507	Clarkei, Hk. f			529
		507	costatum, N. E. Br.		"	531
	• • •	650	? Cuscuaria, Miq		"	543
		650	Griffithii, Schott	•••	"	528
lama Abidalia Galiak		650		•••	"	529
	. ,,	747	Heiferi, Hk. f Hookerianum, Schott	•••	"	529
Agathisanthes javanica, Bl.	•	125	integrifolium, Schott	•••	"	529
Agathotes alata, D. Don		124			"	580
Chirata, D. Don	• • • • • • • • • • • • • • • • • • • •	115	longecuspidatum, Schot		"	530
Agati grandiflora, Desv			malaccense, Schott	•••	"	530
Agave americana, Linn		277	minus, Hk . f	•••	"	
Cantula, Roxb	• ,,	277	nanum, Hk. f	•••	"	530
vivipara, Linn		277	nicobaricum, Hk. f.	•••	"	530
Agelsea, Soland	, 11.	46	nitidum, Kunth	•••	"	529
vestita, Hk. f	• ,,	46	oblongifolium, Schott	•••	"	528
Wallichii, $Hk. f.$		47	palustre, Teysm. & Bin	n.	"	528
Ageratum, Linn	. iii.		pictum, Engl	•••	,,	530
aquaticum, Roxb	. ,,	242	pomilum, Hk. f	•••	"	530
conyzoides, Linn	. ,,	243	Schottianum, Miq	•••	**	529
cordifolium, Roxb	. ,,	243	Scortechinii, Hk. f	•••	`,,	530
strictum, Sims	. ,,	242	Agraulus caninus, Bonuv.		vii.	
Aggeranthus marchantioides	,		Agrimonia, Linn	•••	, ii.	
Wight, lapsu Agyeianthu	8		Eupatorium, Linn	•••	"	361
reticulatus	. v.	786	Eupatorium, Thw	•••		362
Aglais, Lour	. i.	554	javanica, Miq			861
? andamanica, Hiern	. ,,	55 5	lanata, Wall			861
apiocarpa, Hiern		555	nepalensis, D. Don	•••		361
chittagonga, Miq		560	pilosa, Ledeb	•••	•••	361
cordata, Hiern		557	viscidula, Bunge	•••	••	361
crassinervis, Kurz	• • •	556	zeylanica, Moon			362
? decandra, Wall	•••	562	Agropyron, J. Gaertn	•••		367
	. ,,		G-3FJ,	•••		

Agranus	 .		Agrostis	T-1 1	n
Agropyron		Page	1 %	Vol. 1	rage 18
	vii.	370 368	lenta, Ait		289
caninum, R. & S		370	linearis, Retz littoralis, Knapp	•••	246
dentatum, Hk. f		2 94	1 2 44 · 24 · 7 · 10 ·	•••	249
geminatum, Schult		369	lamadamintata Dasa		233
Jacquemontii, Hk. f		368	1 1 1 20 1		246
longe-aristatum, Boiss		370	malmaamain Maan	"	246
repens, Beauv		3 69			99
semicostatum, Nees		369	Matrella, Linn maxima, Roxb		61
striatum, Nees		370	Michauxii, Str. & Wint		254
Thomsoni, Hk. f :		225		•••	256
Agrostemma inflata, G. Don	i.		1 1 1	•••	39
AGROSTIDEÆ	/II. 5	, 223	1		298
_1	. vii.	268	7/ 22 / Thurst	•••	254
abnormis, Munro		254	Munroana, Aitoh. & Hems	, "	263
adscendens, Lange		254	1 4 1 11 17		254
alba, Linn		245	1	"	257
alopecuroides, Lamk		39			264
alopecuroides, Vahl	••	254	Neesii, Stoud		
anatolica, C. Koch	"		nervosa, Nees vii. 256		60
arundinacea, Linn	•	266	? nutans, Poir ·		251
barbata, Pers	"	249	orientalis, Nees		245
bermudiana, Tussac	, ,,	289	panicea, Willd		255
bicuspidata, Hack	• ,,	264	peninsularis, Hk. f	• • •	250 250
biseta, Spreng	, ,,	77	Phuldubbha, Ham	• • •	263
brachiata, Munro	. ,,	256	pilosula, Hack	• ••	
canina, Linn	• ,,	255	pilosula, Trin		264
canina, Munro	. ,,	257	plumosa, Ten	• ••	65
chinensis, Koen	. ,,	298	procers, Retz	• • •	258
ciliata, Str. & Wint	. "	263	pulchella, Roth	• ••	252
ciliata, Trin	٠,,	264	punctata, Lamk	, ,,	21
Clarkei, $H\underline{k}$. f	. ,,	257	pungens, Heyne	,,	251
contracta, Heyne	. ,,	247	pungens, Pursh	, ,,	249
coromandeliana, Retz	. ,,	253	refracta, Moench	,,,	254
crinita, Moench	. ,,	245	P Rora, Ham		245
densa, Bieb	. ,,	254		. 263,	
diandra, Retz	. ,,	247	Royleana, Hack	, vii.	
diffusa, Bess	. ,,	254	Royleana, Munro	,,	263
diffusa, Host	. ,,	254	Royleana, Nees		264
diffusa, Muehlb	. ,,	259	Royleana, Trin. vii. 254	, 263,	265
divaricata, Griseb	, ,,	258		vii.	
effusa, Lamk	. ,,	235	Rura, Ham		253
elongata, Lamk	٠,,	248	scoparia, Koen. vii. 6		
elongata, Roth	,,,	251		. vii	
fertilis, Steud		248	spicata, Vahl	. ,,	251
filiformis, Koen vii		, 290	stellata, Willd	٠,,	289
filipes, $Hk. f. \dots \dots \dots$, vii.	256	stolonifera, Host	"	254
fusca, Heyne	, ,,	72	stolonifera, Linn		254
Hookerians, Clarke	. ,,	256	subaristate, Ait. & Hemsl.	***	255
Hookeriana, Munro vii	. 256	, 264	sylvatica, Torrey	,,,	25 9
Hookeriana, Wight	. vii	255	tenacissima, Jacq	,,	248
inæquiglumis, Griseb		257	tenacissima, Linn. f.	٠,,	251
indica, Forsk		253	tenacissima, Roxb	,,,	25 0
indica, Linn		248	tenuissima, Spreng	,,,	248
involuta, Poir		251	tremula, Willd	,,	25 0
juncea, Lamk		250	triaristata, Knapp		245
latifolia, Heyne		61	triracemosa, Roxb	,,	18
laxa, Rottl		242	verticillata, Vill	,,,	254
•			•		

Agrostis		Vol.	Page	/ Ainslies	V	ol. Page
verticillata, Lam			186	D 31-1 77	ii	ol. Page ii. 389
Villarsii, Poir		"	254	771-44		,, 388
villosa, Koen			19	1		" 000
virgata, Rottl. & Hb. M	iedr	"	298			" 999
73 1			251	Aira, Linn vi		
virginica, Forsk	•••	13		Aira, Linn vi	1. 2	
virginica, Linn		"	249	1 7 7 7 1	🔻	
Wallichiana, Steud.	•••	"	264		•••	" 310
Wightii, Nees	•••	29	258		•••	,, 303
Wightii, Munro	•••	"	257		•• ;	, 78
Wightii, Schmid	•••	"	254	brevifolia, Bieb	,	,, 278
Zenkeri, Steui		"	258	cæspitosa, Linn	,	,, 273
zevlanica. P Wight	•••	,,	58			,, 272
sp., Hk. f. & T vii. 2	57,	258,	268	capillaris, Heyne	,	, 58
sp Str. & Wint	vii.	263	264	caryophylles, Linn v.	ii. 27	72, 422
sp., Wall	vii.	245.	257			ii. 65
Agrostistachys, Dalz		٧.	405	1 7		, 25
filipendula, Hk . f			407	387a11		979
Gaudichaudi, Muell.		"	406	1		900
	•••	"	406		٠ :	079
Hookeri, Benth	•••	"	406	August Toma		. 272
indica, Dals	•••	"		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	•• •	
longifolia, Benth	•••	"	407		•• ;	, 272
longifolia, Kurz	•••	"	406		,	, 269
Maingayi, $Hk.f.$	•••	"	406		,	, 299
Agrostophyllum, Bl	•••	₩.	823	filiformis, Roxb	,	, 298
callosum, Rchb.f	•••	"	824	glauca, Spreng	,	, 308
glumaceum, Hk . f . \forall .	824,	vi.	193	? indica, Linn	,	, 41
khasianum, <i>Griff</i>		٧.	824	1 24		, 43
longifolium, Bl			824	instrumentation Vacon	. ,	95
mains Hk. f. V.	824	. vi.	193	Pinnii III. 4		979
longifolium, Bl w. majus, Hk. f v. paucitlorum, Hook, f. v.	824	vi.	193	l	•	979
planicaule, Rohb. f.		₹.	824		,	07
panicate, Robot.	•••		825		,	979
zeylanicum, Hk. f	•••	"	285		,	, 273 . 272
Agyneia, Vent	•••	v.	285		,	
affinis, Kurz	•••	"		multiculmis, Dumort	. ,	, 272
baccitormis, A. Juss.	•••	>3	285		. ,	
ciliata, Wall	•••	"	397		,	
coccine c , Ham	•••	79	808	purpureo-argentea, Gilib.	,	
flexuosa, Heyne	•••	,,	311	repens, Heyne	,	, 57
impubes, Hb. Madr	•••	"	308	rigida, Dulac	,	979
impubes, Vent	•••	"	285	spicata, Linn	,	970
latifolia, Moon Cat	•••	"	347	subspicata, Linn	,	972
multilocularis, Willd.	•••	,,	307	M. J Managa	,	979
obliqua, Willd	•••	"	311	Antonialas Olamba	,	979
ovata, Miq			332	4		070
phyllanthoides, Spreng.		"	285	1	-	04
? pinnata, Miq		"	317	l	,	050
pubera, Hb. Madr		"	307		.; ` <u>;</u>	9, 243
	•••	,,	304	*p., Griff v		
tetrandra, Ham	•••	,"			V	
Aikinia carnosa, G. Don Aikinia elegans, Wall.	•••	iv.	369		▼i	ii. 308
Aikinia elegans, Wall.	•••	_	161		,	, 308
Ailantus, Desf	•••	i.	518		,	
excelsa, Roxb	•••	"	518	pubescens, Link	. ,	
glandulosa, Desf. :	•••	"	518	valesiaca, Link	. ,	808
malabarica, DC	•••	"	518	AIZOIDEÆ	ii	
Ainsliæs, DC	•••	iii.	888		ii	
angustifolia, Hk. f. & T.		"	388		. ,	050
aptera, DC		"	338		iv	
	•••	77		. —0-2Pm)		

A 9		_	. Alabamina			_
Ajuga		Page	Alchemilla			Page
brachystemon, Masim		708	indica, Gardn	•••	ii.	361 360
bracteosa, Wall	•••	702	vulgaris, Linn	•••	"	361
decumbens, D. Don		704	vulgaris, Wight	•••	"	420
decumbens, Thunb	• ,,	704	Alchornea, Sw	•••	▼.	
densiflora, Wall	• ,,	7C8	discolor, Hk. f	•••	"	421
depressa, Maxim	• ,,	703	javensis, Muell	•••	17	422
disticha, Roxb	• ,,	672	mollis, Muell	•••	"	420
fruticosa, Roxb	• ,,	678	rugosa, Muell	•••	"	422
furcata, Link	. ,,	672	tiliæfolia, Musll	•••	"	421
geniculata, Maxim	• ,,	704	villosa, Muell	•••	"	421
laza, Ham	. ,,	701	Zollingeri, Hassk	•••	19	421
lobata, D. Don	. ,,	702	. 8p	•••	??	422
macrosperma, Wall	• ,,	704	Aldrovanda, Linn	•••	ii.	425
Povata, Wall	. ,,	704	verticillata, Roxb	•••	"	425
parviflora, Benth	, ,, .	703	vesiculosa, Linn	•••	"	425
remota, Benth	. ,,	703	Alectoridia Quartiniana,	A.		
repens, Roxb	. ,,	704	Rich	•••	vii.	146
sikkimensis, Miq	. ,,	704	Alectra, Thunb	•••	iv.	297
Thomsoni, Maxim		70 4	cordata, Benth	•••	"	297
AJUGOIDEZ		607	indica, Benth	•••	"	297
Alangium, Lamk	. ii.	741	orobanchoides, Benth.	•••	"	297
decapetalum, Lamk	. ,,	741	? Thomsoni, Hk. f	•••	79	297
ebenacewm, Griff	. ,,	742	Aletris, Linn	•••	vi.	264
glandulosum, Thw	. ,,	742	hyacinthoides, Linn.	•••	"	27 0
hexapetalum, Lamk	. ,,	741	khasiana, $Hk. f.$	•••	"	265
Lamarckii, Thw	. ,,	741	lanuginosa, Bureaud	Æ		
latifolium, Miq	. ,,	741	Franch	<i></i>	22	265
sundanum, Kurz	. ,,	741	litoralis, Kon	•••	"	264
tomentosum, Lamk		741	nepalensis, $Hk. f.$	•••	23	264
Albersia caudata, Boiss	•	721	sikkimensis, $Hk. f$	•••	"	265
livida, Kunth	. ,,	721	zeylanica, Mill	•••	"	270
oleracea, Kunth	. ,,	721	Aleurites, Forst	•••	Y.	384
polygama, Boiss	. ,,	721	ambinus, Pers	•••	,,	3 85
	ii. 2 0,	, 131	cordata, Muell	•••	"	384
Albikkia schænoides, Presl	. v i.	678	cordifolia, Steud		"	38 5
scirpoides, Presl	. ,,	678	laccifera, Willd		"	388
Albissia, Durass	22	298	molluccana, Willd		"	384
affinis, Fourn		301	triloba, Forst	₹.	239,	385
amara, Boiv		301	Alhagi, Desv	•••	ii.	145
glomeriflors, Kurz		300	mannifera, Desv	•••	93	145
Julibrissin, Durass		300	maurorum, Desv		"	145
latifolia, Boiv		298	napaulensium, DC		"	145
Lebbek, Benth		298	Alisma, Linn		νi.	559
lebekkioides, Benth		299	apetalum, Ham	•••	77 .	560
lophantha, Benth	•	29 8	calophyllum, Wall		"	56 0
lucida, Benth		299	oristatum, Wall	•••	"	561
micrantha, Boiv		299	glandulosum, Thw	•••	"	560
myriophylla, Benta		300	? Hamiltonianum, Wall	••••	,,	561
odoratissima, Benth		299	P intermedium, Griff.	•••	"	559
pedicellata, Baker		299	Kotschyi, Hochst	•••	"	560
procera, Benth		299	obtusifolium, Thw		"	560
sericocephala, Benth		801	oligococoum, F. Muell.		"	560
stipulata, Boiv		300	parnassifolium, Mich.		"	560
umbrosa, Benth	• • • • • • • • • • • • • • • • • • • •	302	Plantago, Linn	•••	"	559
Wightii, Grah	•••	801	pubescens, Ham	•••	"	561
Alchemilla, Lins	**	360	ranunculoides, All	•••	"	560
ceylanica, Moon		861	reniforme, D. Don	•••	"	560
	••		,		77	

Alisma	37.01	Domo	Allium	Wal	Page
14416 21 337131.3		Page 560	obtusifolium, Kl. & Gar	voi	
. A . 77 TY		561	l		343
A	", ∀i.		G-1-		344
4.33		490	70-11 1)	,,	339
TT		490		·· ,,	340
771	"	490	D T		337
	iii.	48	17 0. 17	• • •	345
		48	D 1.22 (1 1)		348
	"	48			339
A 11 . 1 . 12	iii.	312	1		339
• • • •		313		•••	339
	"	313	T !	•• ,,	337
77	"	313	0-1		338
9	"	314	Cahnanti Danel	•••	343
_ · TT7. £ \$4 (III	"	313	Commence 2 Dec 1	•	338
nivea, Hk. J. Y T Stoliczkai, Clarke	"	313		•• ;;	343
And the Annual Process	"	313	aibiniana Timm		338
tomentosa, Dene tridactylites, Hk. f. & T	"	313	ailahimanga Dukan	,,	341
	"	313	and and an in Miles	,,	341
vestita, Hk. f. & T	"	313	Charachard Dalam	,,	340
Allelotheca Urrillei, Steud.	-":			•• ,,	343
Alliaria officinalis, Andr	vii.	151	l Contrato Trans	,,	337
	vi.	301		,,	339
Allium 7 ium	vi. vi.	337	1 1 4 2 4 4 4	,,	343
Allium, Linn		337	4. 0.0	,,	339
Ampeloprasum, Linn	"	337	m	,,	340
ascalonicum, Linn	"	007	1 1	,,	343
atropurpureum, Waldst. &		344	adiain anno (1 Dan	,,	343
Kit	"		and a facility of the con-	•• ,,	342
atrosanguineum, Schrenk	"	338 342	37-11	,,	341
auriculatum, Kunth	"	341		•	339
Bakeri, Regel	"	339	TTT . 12 * 12 * 42	•••	341
blandum, Wall	"	341	A 33	• • • • • • • • • • • • • • • • • • • •	
cæruleum, Wall	75	337			717
Cepa, Linn	"	344	1 1772 L 4	"	717
Clarkei, Hk. f	"	340	J. L. J		717
consanguineum, Kunth	"	337			717
Cumaria, Ham	**	342	1.0		716
ellipticum, Wall easertum, Baker	"	841			717
	"	338	3372 -1		717
Fedschenkoanum, Regel	"	344	procumbens, Wight	•••	717
Govanianum, Wall	"	339	A 11 1.2- 707	ii.	527
grandiflorum, Ledeb Griffithianum, Boiss	"	339	exigua, Bl		527
"	"	341	CLEANALLY TIL A	•	527
1 17	"	344	1.1		527
- · · · · · · · · · · · · · · · · · · ·	"	342			527
T 111 TZ 13.	"	339	Allowby-law Tiles		678
	"	342	4.7		674
junceum, Jacquem	3 39,		Calla Di		673
	000, ▼i.	339	7		674
lilacinum, Royle		839	7. 7	• • • • • • • • • • • • • • • • • • • •	674
longisepalum, Bertol	"	840	7		674
longistamineum, Royle	"	345		•••	674
loratum, Baker	"	345		. 674	
macranthum, Baker	"	345			674
narcissiflorum, Vill narcissifolium, Linn	"	345	W1 377	•	674
	"	345 344		•••	674
nivale, Jacq	"	927	serratus	. ,,	UI I

Allophylus	Wal.	Page	Alopecurus Vol. Page	
ternatus, Lour		674	nepalensis, Trin vii. 239	
		674	minuscano Tono 999	
1		673	m	-
Allopythion Hookeri, Schot				-
Allozygia cernua, Naud	ii.	526	maludama Danma " 996	_
A 3 (7 4	٧.	600	maniagua Tinn 945	
** * * *		348	namicous O Wroll " 920	
	••	348	mhalanoidea Sohna " 939	
integrifolia, Roxb nepalensis, D. Don	•	600	muntamora Attah 990	•
	••	600	mentancie Linn 239	
nitida, Endl				
Alocasia, Schott		527	namena Diah " 000	
acuminata, Schott	•••	528		
alba, Schott	"		rubicundus, Ham ,, 86	
amabilis, Hort	* **	527	ruthenicus, Weinm ,, 238	
Beccarii, Engl	"	527	sibiricus, Hort ,, 238	
commutata, Schott	"	526	subaristatus, Pursh " 238	-
cucullata, Schott	,,	525	typhoides, Burm ,, 82	
decipiens, Schott	,,	526	ventricosus, Pers ,, 238	
denudata, Engl	,,	525	sp., Wall ,, 239	
fallax, Schott	,,,	527	Alphonses, $Hk.f. \& T.$ i. 88	
fornicata, Schott	,,	52 6	elliptica, Hk . f. & T , 90)
indica, Schott		525	lutea, $Hk. f. \& T. \dots , 89$)
Jenningsii, Veitch	,,	523	madraspatana, Bedd ,, 89)
longiloba, Miq		527	Maingayi, $Hk. f. \& T. \dots $, 90	•
macrorrhiza, Schott	••	526	sclerocarpa, Thw ,, 89)
montana, Schott	••	525	wantricon H & f. m Q0	•
navioularis, Koch & Bouche	. "	527	garlanica Uh f lon " 90	
adama O Vaah		526	Alpinia, Linn vi. 252	
		528	alba Rose 959	
		525	Allnohan Dose 959	
		525	nametica Pass	
rugosa, Schott		525	Asericari Moon vide seriega 256	-
singaporensis, Lind	• • • • • • • • • • • • • • • • • • • •	5 28	augantiaca Well 955	
sp., Griff				
Aloe perjoliata, Willd		264	,	
vera, Linn	* **	2 70		_
zeylanica, Jacq			calcarata, Rosc ,, 254	
Alopecurus, Linn	, v ii.		Cardamomum, Roxb ,, 251	_
agrestis, Linn	* **	239	Cardamomum-medium, Roxb.,, 235	
altissimus, Schur	"	238	carnea, Griff ,, 258	
aristatus, Gouan	, ,,	245	cernua, Sims ,, 254	_
aristulatus, Michw	"	238	conchigera, Griff ,, 253	
arundinaceus, Poir	, ,,	238	costata, Roxb ,, 235	
australis, Nees	,,,	239	cristata, Griff ,, 256	j
brachystachys, Bieb		238	P decurvata, Baker , 257	
? diandrus, Griff	,,	239	Galanga, Sw ,, 253	,
elatior, Jacq	,,	238	Galanga, Wall ,, 258	3
fulvus, Sm		238	Hamiltoniana, Wall ,, 217	7
geniculatus, Linn		239	involucrata, <i>Griff.</i> ,, 256	,
geniculatus, Poll		238	linguiformis, Roxb ,, 235	,
himalaious, Hk . f		238	malaccensis, Rosc ,, 255	,
? hordeiformis, Linn	• • •	85	malaccencie Wall 986	
indicus, Heyne	••	83	Manii King " 959	
indicus, Linn	••	82	9 Micaiomia Wall 900	
monspeliensis, Linn	••	245	mutice Rock Ord	_
	•	238	Nassiana Chah	_
*** TT3		239	Winner Charles " 044	
		289	1 mmtana Pasa	
navičularis, Ham	. ,,	230	nutans, Kosc ,, 256	•

	-					
Alpinia	Vol.	Page	Alstonia		Vol.	Page
petiolata, Baker	vi.	255	lucida, D. Don			667
Rafflesiana, Wall	99	255	macrophylla, Wall		"	648
Rheedii, Wight	"	254	neriifolia, D. Don	•••	"	642
Roxburghii, Sweet	"	255	scholaris, Br	•••	"	642
scabra, Benth	"	256	spathulata, Bl	•••	"	64°
? secunda, Baker	"	257	spectabilis, Kurs		"	643
sericea, Moon, lapsu Aseri-	••		venenatus, Br	•••	"	642
сеа	**	256	Alternanthera, Forsk	•••	iv.	781
sessilis, Koen	"	219	denticulata, Benth	•••		732
viridiflora, Griff	"	253	denticulata, Br	•••	"	732
Wrayi, King		254	denticulata, Wall	•••		781
singiberina, Hk. f	"	253	nodifiora, Br		"	782
Alseodaphne, Nees	₹.	143	prostrata, D. Don	•••		781
0		146	sessilis, Br		"	781
TT1. 6	"	146	Althese, Linn	•••	i.	819
3	**	145	-1.//- XX7-11			819
A 11 37	"	146	coromandelina, Cav.	•••	"	819
	**	143	T - 3 - 2 - 2 T 2	•••	"	819
· •• •••	99	125	- A0 - J 12 - T	•••	**	819
	"	147		•••	"	319
? lucida, Nees	. 37	145		•••	"	319
panduriformis, Hk. f	"	144	taurinensis, DC Altingia, Noronha	•••	??	429
peduncularis, Hk. f	"			•••	ii.	429
petiolaris, Hk. f	"	145	excelsa, Noronha	•••	"	788
semecarpifolia, Nees	"		Alwisia tenuis, Lindl	•••	₹.	157
umbelliflora, Hk. f	."	145	Alysicarpus, Neck	•••	ii.	160
Alsine, Burm	ij.	664	belgaumensis, Wight	•••	"	158
Meyeri, Boiss	i.	286	bupleurifolius, DC	•••	"	
Roylei, Fenzl	; '	236	bupleurifolius, Roxb.	•••	"	159
ALSINEÆ	i.	213	bupleurifolius, Wall.	•••	"	159
Alsinella Wallichiana, Benth.	i.	230	diversifolius, Wall	•••	"	158
Alsodeia, Thouars	i.	186	glaber, E. Meyer	•••	**	159
bengalensis, Wall	17	186	glumaceus, Wall	•••	"	159
Brownii, Korth	. 11	187	gracilis, Edgew	•••	"	158
dasycaula, Miq	**	188	hamosus, Edgew	•••	"	157
echinocarps, Korth	99	188	Harnieri, Schweinf.	•••	**	158
Griffithii, Hk. f. & T	"	187	heterophyllus, Benth.	•••	99	158
lanceolata, Hk. f. & T	,,	188	Heyneanus, W. & A.	•••	"	159
macrophylla, Done	"	187	Hochstetteri, A. Rich.	•••	"	159
Maingayi, $Hk.f. \& T$	"	188	longifolius, W. & A.	•••	. 17_	159
mollis, Hk. f. & T	,,	188	ludens, Wall	ii.	158,	
obtusa, Korth	,,	187	lupulinus, Stocks	•••	ii.	159
racemosa, Hk. f. & T	"	187	monilifer, DC	•••	"	157
Roxburghii, Hk. f. & T	"	186	nummularifolius, DC.	•••	13	158
virgata, Hk. f. & T	,,	189	obovatus, Edgew	•••	**	159
Wallichiana, Hk. f. & T	"	187	parvistorus, Dalz	•••	99	172
zeylanica, Thw	"	187	pilifer, Wall	***	19	159
ALBODBIEE	i.	182	pubescens, Law	•••	99	160
Alsomitra, Benth. & Hk. f	ii.	634	quadrangularis, Edgew.	•••	"	159
clavigera, $Hk. f.$	"	634	racemosus, Benth	•••	99	160
sarcophylla, Hk. f	, 99	634	rotundifolius, Dalz	•••	"	172
Alstonia, Br	iii.	641	rotundifolius, Wight	•••	**	157
angustifolia, Wall	77	643	Rubibarna, Wall		157,	158
costata, Wall	"	643	rugosus, DC	•••	ii.	159
P costulata, Miq	,,	644	scariosus, Grah	•••	**	159
cuneata, Wall	"	642	spicatus, Royle	•••	"	159
grandifolia, Miq	"	648	styracifolius, DC	•••	20	159
Kursii, Hk. f	"	643	styracifolius, Wall	•••	99	159
•	•				••	

Alysicarpus	37 -1	T	Amaranthus Vol. Pag	_
tetragonolobus, Edgew	A OF	Page 159	THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRE	
4 (8' 1) 4 (5)		158	1	8
	"	158		=
vaginalis, DU	99	159	facciatus Bomb 799	=
vaginalis, Wall	"	159	Acres Time 710	-
varius, Wall Wallichii, W. & A	"	159	formandaines Ham 716	
A wwarten a	ŗ	129	congotions Time 710	_
ALYSSINES	i.	141		
Alyssum, Linn		141	Time 79	
canescens, DC cochlearioides, Roth	"	145	ingmonus Wall 79	_
	"	141	in amount will 79	
maritimum, Lam	19	141	James Clatus Book "710	_
minimum, Willd tenuifolium, DC	"	141	limidus Wort Person 791	
	,"	409	Janidas Donb 790	-
Alytostylis, Hk. f	i.	634	l managatanna Tima 790	_
Alyxia, Br	iii.	630		-
P calophylla, Wall	33		ministers Hort Arism 791	
oeylanica, Wight	"	636 695	1	_
coriacea, Wall	"	635	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	_
P cuspidata, Wall	"	629	mucronatus, Hort. Petrop. ,, 720	
fascioularis, Benth	"	636	oleraceus, Linn ,, 721	=
glaucescens, G. Don	.23	630	oleraceus, Roxb ,, 719	_
gracilis, Benth	"	634	paniculatus, Linn ,, 718	
Gynopogon, Wall	"	635	paniculatus, Wall ,, 71	_
lucida, Wall	"	635	, posterior () = 0.00 () ()	8
odorata, Wall	"	636	perconnection, process. III , , ,	3
pilosa, <i>Miq</i>	"	635	polygamus, Linn iv. 72	_
pumila, Hk.f	,,	635	polygamus, Roxb ,, 720	_
stellata, R. & S	,,	636	polygamus, Thw " 720	
Amanoa acuminata, Bedd	٧.	276	polygamus, Wall ,, 72	
chartacea, Baill	,,	275	polygonoides, Roxb ,, 721	
collina, Baill	,,	274	polystachyus, Ham ,, 720	0
ferruginea, Thw	"	280	rubricaulis, Page " 725	3
indica, Thw	,,	279	sanguineus, Linn ,, 719	•
indica, Wight	"	279	speciosus, Sims ,, 719	9
pallida. Thw	"	279	Bpinosus, Linn 718	3
patula, Thw	"	279	strictus, Willd " 719	Ð
tomentosa, Baill	"	271	sylvestris, Desf ,, 721	L
AMARANTACEÆ	iv.	718	tenuifolius, Willd ,, 721	8 -
AMARANTER	iv.	718	tenuifolius, Wall " 721	L
Amarantus, Linn	iv.	718	tricolor, Linn ,, 719	•
acroglochin, Spreng	₹.	3	tristis, Hb. Rottl. & Heyne " 720)
adscendens, Hort. Petrop.	iv.	721	tristis, Linn " 719	9
adscendens, Rohb	"	721	tristis, Wall iv. 720, 721	L
alopecurus, Hochst	"	719	viridis, Linn iv. 720	
amboinicus, Hb. Ham	"	720		3
Anacardana, Ham	"	719	AMABYLLE vi. 277	7
angustifolius, Roxb		722	AMARYLLIDEÆ vi. 277	7
ameticidana Domosti	"	724	Amaryllis carnosa, Ham vi. 280	
atropurpureus, Roxb	27	722	comosa, Ham ,, 281	-
TO 144 T. June 1	"	721	inciente Von	_
95114 971 77	"	721	Inditalia Tillian "000	
Blitum, HD. Fries	**	721	linesta Tamba 994	-
Blitum, Maxim	"	722	1 000 00	_
campestris, Willd	23	720	l ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	
Caturus, Heyne	"	719	andania Time 000	
caudatus, Linn	37	719		_
caudatus, Hochst	"	3	Amberboa Goniocaulon, DO. iii. 377	
cauliflorus, Link	▼.	9	indica, DO	,
VOL. VII.			P	

	Wal	Page	Ammania	,	741 1	Page
Amblogyna polygonoides,	V OL.	rege	indica, Lamk	•••	7ol. 1 ii.	<i>5</i> 89
Dals. & Gibs	iv.	721	lanceolata, Heyne	•••	29	570
Amblyachyrum mangalorense,			latifolia, Linn	•••	"	571
Hochst	vii.	142	latifolia, Wall	ii.	56 6 ,	567
Amblyanthus, A. DC		583	microcarpa, DC	•••	ii.	571
glandulosus, A. DC	••	533	multiflora, Rosb	••••	33	570
		335	nana, Roxb	ii.	566,	
Amblyglottis angustifolia, Bl.	₹.	854	nana, Wall	•••	ii.	569
emarginata, Bl	,,	851	octandra, Linn. f	• •••	"	571
f flava, Bl	"	851	pentandra, Rozb	•••	"	568
pulchra, Bl	"	854	peploides, Spreng	•••	"	566
veratrifolia, Bl	"	851	pygmæa, Kurs	·	"	568
Ambrina (Ambrosia) Botrys,			repens, Rottl	•••	"	566
Moq	٧.	4	Ritchiei, Clarke	•••	"	566
Ambrosinia ciliata, Roxb	₹i.	492	Rotala, F. Muell	•••	99	567
retrospiralis, Roxb	"	493	rotundifolia, Ham	•••	99	566
spiralis, Roxb	"	494	rubra, Ham	•••	"	568
unilocularis, Wight	. "	494	salicifolia, Monti	•••	"	569
Ambulia aromatica, Lamk	i▼.	268	senegalensis, Lamk.	•••	,,	570
ebracteata, Ham	??	268	simpliciuscula, Kurz	•••	"	568
Ameletia acutidens, Miq	ii.	566	subrotunda, Wall	•••	"	571
elongata, Bl	33	566	subspicata, Benth	•••	"	567
floribunda, Wight	"	567	subspicata, Hohen	•••	"	568
indica, DC	"	566	tenuis, Clarke	•••	"	567 ECO
polystachya, Wall	"	566	verticillata, Boiss	•••	"	569
rotundifolia, Dalz. & Gibs.	"	567	verticillata, Lamk	•••	"	569 570
subspicata, Benth	"	567	verticillata, W. & A.	•••	"	569
tenuis, Wight	"	567	vesicatoria, Roxb	•••	"	572
Amelina Wallichii, Clarke	Vi.	383	Wallichii, Kurs	•••	??	565
Amentacea, Wall Amerimmum fasciculatum,	₹.	626	Ammi copticum, Boiss.	•••	ii.	682
17	ii.	109	3 12 327 - 11	•••		693
.1		246	A	•••	iï.	665
pallidum, Ham	"	108	Amomum, Linn	•••	vi.	238
secundum, Ham	"	247	aculeatum, Roxb	•••	,,,	242
Amherstis, Wall	ii.	272	acuminatum, Thw		"	237
nobilis, Wall	"	272	araneosum, Baker	•••	"	234
AMHERSTIEE	ii,	61	aromaticum, Rozb	•••	"	241
Amischotolypa glabrata,		-	Benthamianum, Trim.	•••	"	242
Hassk	vi.	384	biflorum, Jack		"	240
marginata, Hassk	,,	383	cannæcarpum, Benth.	•••	"	240
mollissima, Hassk	"	888	Cardamomum, Linn.	•••	"	251
Ammanella linearis, Miq	iï.	571	ciliatum, Baker	•••	"	238
Ammannia, Lina	ii.	566	corynostachyum, Wal	l	"	238
auriculata, Willd	79	570	costatum, Benth	•••	"	235
baccifera, Linn		569	Curcuma, Jacq	•••	"	214
cordata, W. & 4	,,	570	dealbatum, Rozb	`	,,	239
debilis, Ait	,,	569	echinatum, Willd	•••	,,	242
densiflora, Miq	"	569	eletteriodes, Baker	•••	99	240
densiflora, Roth	"	568	Fenzlii, Kurz	•••	,,	234
dentelloides, Kurs	"	568	floribundum, Benth.	•••	"	238
egyptiaca, Willd fimbriata, Wight	"	569	fulviceps, Thw gomphocheilos, Baker	•••	,,	287
	33	569	gomphocheilos, Baker	•	93	286
floribunda, Clarke	"	567	gramineum, Wall	•••	,,	288
glauca, Wall ,	"	569	graminifolium, Thw.	•••	"	288
hesandra, Wall	"	569	hypoleucum, Thw	•••	"	240
Heyneana, Wall	,,	569	involucratum, Benth.	•••	"	288

Amomum	V ol.	Page	Amoora	•	Vol.	Page
Kingii, Baker	vi.		rubescens, Hiern		i.	561
Konigii, Baker	"	237	rubiginosa, Hiern	•••	"	561
latifolium, Lamk	,,	211	spectabilis, Miq	•••	"	561
Leonurus, Kæn	,,	286	Amorphophallus, Bl	•••	٧i.	518
linguiforme, Benth	"	23 5	bulbifer Bl	•••	"	515
littorale, Kæn	,,	239	burmanicus, Hk. f	•••	**	517
macrocheilos, Baker	"	23 5	campanulatus, Bl	•••	"	518
macrodus, Scort	,,	236	campanulatus, Bl	•••	"	514
macrostephanum, Baker	,,	243	Chatty, André	•••	"	518
Maingayi, Baker	"	235	chlorospathus, Kurz	•••	"	516
masticatorium, Thw	73-	238	commutatus, Engl	•••	,,	515
maximum, Roxb	"	239	dubius, Bl	•••	"	514
megalocheilos, Baker	,,	236	elatus, Hk. f	•••	"	517
metriocheilos, Baker	"	234	giganteus, Bl	•••	"	517
microstephanum, Baker	,,	239	hæmatospadix, Hk. f.	•••	"	517
montanum, Koen	"	248	longistylus, Kurs	•••	"	515
nemorale, Benth	,,	233	lyratus, Engl	•••	"	517
pauciflorum, Baker	,,	238	margaritiferus, Kunth	•••	"	519
pterocarpum, Thw	"	241	oncophyllus, Prain	•••	"	516
pulchellum, Thw	,,	251	Prainii, Hk. f	•••	"	516
racemosum, Lam	"	251	purpurascens, Kurs	•••	"	515
repens, Willd	"	251	Rex, Prain	•••	"	514
roseum, Boxb	"	244	sparsiflorus, Hk. f	•••	"	516
rubro-luteum, Baker	,,	236	sylvatious, Kunth	•••	"	518
rufescens, Benth	"	242	tuberculiger, Engl	•••	"	517
scyphiferum, Kan	,,	237	variabilis, Bl		"	517
sericeum, Rozb	"	289	virosus, N. E. Br	,	"	518
spherocephalum, Baker	,,	234	zeylanicus, Bl	•••	11	518
spurium, Gmel	"	247	Ampacus angustifoliu	8,		
stenoglossum, Baker	"	284	Rumph	•••	i.	488
subulatum, Roxb	"	240	AMPELIDEA	•••	i.	644
sylvestre, Poir	"	247	Ampelopsis himalayana, B	loyle	i.	656
triorgyale, Baker	"	237	? ternata, DC	•••	**	650
uliginosum, Kan	"	241	Ampelygonum chinense, L	indl.	٧.	45
vitellinum, Lindl	"	242	Amphicarpæa, Elliott	•••	ii.	181
xanthioides, Wall	"	239	Edgeworthii, Benth.	•••	,,	181
xanthophlebium, Baker	"	241	ferruginea, Benth	•••	"	182
Zedoaria, Berg	"	211	monoica	•••	"	181
Zerumbet, Linn	"	247	Amphicome, Lindl	•••	iv.	885
Zerumbeth, Kon	"	211	arguta, Lindl	•••	11	385
Zingiber, Linn	"	246	Emodi, Lindl		11	885
sp., <i>Griff.</i>	"	240	Amphidonax bengalensi	s,	••	
Sp., Kan	"	237	Nees	•••	vii.	303
Amoora, Rosb	ï.	559	bifaria, Nees	•••	"	303
Pauriculata, Miq	"	560	Hovnii, Nees	•••	"	270
canarana, Benth. & Hk. f.	"	560	obtusiflora, Thw	•••	» .	270
P Championii, Benth. &	"		tenella, W. & A	•••	"	270
Hk. f	"	562	Amphilophis, Trin	•••	vii.	171
chittagonga, Hiern	"	559	Amphipogon humilis, H	am.	vii.	284
cucullata, Rosb		560	Amphiraphis albescens,	DC.	iii.	257
decandra, Hiern	- "	562	cuspidata. DC	•••	"	296
ficiformis, Wight		546	heterotricho, DC	•••	"	295
lanceolata, Hiern	"	560	indica, Loss	•••	"	227
Lawii, Benth. & Hk. f	"	561	leiocarpa, Benth		"	245
macrophylla, Nimmo	"	559	mollis, Wall		"	227
Maingayi, Hiern	"	562	peduncularis, DC		"	258
Bohituka, W. & A	"	559	pubescens, DO	•••	21	245
	77					

4					
		Page	Anæctochilus	•	Page 96
	111.	296	Griffithii, Hk. f	. vi.	
Wightiana, Wall	"	301	lanceolatus, Lindl	. ,,	101
seylanica, DC	,,	257 .	luteus, Lindl	. ,,	101
Amydrium humile, lapsu	•		regalis, Bl		95-
Anadryum, Schott	ri.	549	Reinwardtii, Bl		95
	ii.	818	70 1 1 1 7 17		95
T		_			95
communis, Linn	"	318	setaceus, Lindl		
humilis, Edgew	"	314	tetrapterus, Hk. f		96
persica, Lina	"	8 13	Anagallis, Tournef	. iii.	505
Amyris acuminata, Roxb	i.	580	arvensis, Linn	. ,,	506
? Agallocha, Roxb	,,	529	cærulea, Lam	. ,,	506
Comminhera Donb		529	multangularis, Ham	•	503
	"	506	1 4		62
dentata, Willd	"				62
gileadensis, Roxb	"	530	indica, Lindl	• ,,	
heptaphylla, Roxb	"	504	nepalensis, Grah		62
nana, Roxb	,,	506	Anamirta, Colebr	i.	98
pentaphylla, Roxb	,,	50 4	Cocculus, W. & A	. ,,	98
mundata Dark		505	flavescens, Miers		98
annatifalia Datal	"	529	paniculata, Colebr		98
	"	513			98
	"		toxifera, Miers		
	"	506	Anandria Bellidiastrum, DC		390 .
sumatrana, Roxb	,,	505	Anaphalis, DC	. iii.	
and and an Date	,,	532	adnata, DC	. ,,	282
	Ÿ.	18	araneosa, DC	. ,,	283
alamanda M Diah		20	aristata, DC		285
	"	19		. 282,	290
14.4	"				===
	"	16	brevifolia, DC		
phyllophora, Kar. & Kir.	,,	18	chionantha, Hk. f. & T	, ,,	280
setifers, Moq	,,	19	cinnamomea, Clarke	,,,	281
- 1 116.11 41-1	"	19	contorta, Hk. f		284
	ii.	7	cuneifolia, Hk. f		280
	ii.	7	Poutchica, Clarke		284
Amanadiam Datah		20		•••	283
	ii.			• • •	285
	"	81	Falconeri, Clarke	•••	
occidentale, Linn	"	20	fruticosa, Hk. f	• ••	282
officinarum, Gærtn	,,	31	Griffithii, Hk. f	. ,,	280
	i.	580	Hookeri, Clarke	. ,,	282
Acres Acres Dadd	"	580	leptophylla, DC		285
A 100.111 1/		580	linearis, DC.?	•	286
9 hamiandra <i>Maina</i>	"	581	A1 1	••	286
	"	580			282
	"		margaritacea	"	
Maingayi, Mast	"	580	monocephala, DC	"	280
puberula, Kurs	,,	581	mucronata, Clarke	,,	280
Anacyclus aureus, Lamk i	ii.	817	mucronata, DO	,,,	280
Anadendrum, Schott v	ri.	539	neelgerrians, DC	"	287
1-4:8-12 D1. f		540	Notoniana, DC	•••	284
O-1 -44	"	540		. 279.	280
33 O-1-44	"	1			280
	"	540	nubigena, Clarke		
montanum, Schott	,,	540	oblonga, DC	. ,,	288
	,,	549	polylepis, Clarke	**	280
Ansectochilus, Bl vi. 9		179	polylepis, DC	,,	280
albolineatus, Par. & Rohb.f. v		96	Royleans, DC	• • • • • • • • • • • • • • • • • • • •	280
1		95	Royleana, Clarke		280
	,,	99		"	280
	,,		P Royleana, Hk. f. & T		288
	,,	102	Stoliczkai, Clarke		
	"	95	subumbellata, Clarke	"	281 -
	,,	100	tenella, DC	11	2 85
· · ·	-		•		

Anaphalis		Page	Andersonia _	. 1		Page
Thwaitesii, Clarke	. iii.	284	cucullata, Roxb	•••	i.	560
triplinervis, Clarke	. "	281	Rohitoca, Griff		,,	659
virgata, Thoms		285	Rohituka, Roxb		**	559
Wightiana, DC		286	Andira Horsfieldii, Lesch.		iï.	348
Wightiana, Thw		286	Andrachne, Linn	•••	٧.	288
1 11 61 11	•••	281	apetala, Roxb	•••	"	845
		286	· ·			284
zeylanica, Clarke		551	1 0 1 1 TO 1	•••	"	275
Anaphyllum, Schott				•••	"	284
Wightii, Schott		551	chinensis, Bunge	•••	"	285
Anarthrosyne cordata, Klotz		169	Clarkei, Hk. f	•••	"	288
Anatherum caudatum, Sohul	i. V11.	107	cordifolia, Muell	٠.	17	
glabrum, Schult	. ,,	176	Decaisneana, Baill		"	284
muricatum, Beauv	. ,,	186	Doonkyboisca, Heyne		27	268
parviflorum, Spreng	. ,,	179	fruticosa, Dene	•••	37	284
porto-ricense, Spreng	. ,,	107	fruticosa, Heyne		"	287
Anaua sumatrana, Miq		33 8	orbiculata. Roth		"	275
Anauxanopetalum Schwenkii			rotundifolia, C. A. Mey.		11	284
Teysm. & Binn,	2.2	27	telephioides, Linn		"	284
A 04 77.7		68	trifoliata, Roxb			345
		68	Andrographis, Wall		ïv.	501
javanica, Bl		68				505
luzonensis, A. Gray			affinis, Hook	•••	"	502
sumatrana, Miq	. ,,	51	alata, Nees	•••	**	506
zeylanica, Hk. f. & T		68	Beddomei, Clarke	•••	"	
Anchues, Linn	. iv.	168	ceylanica, Nees	•••	"	508
arvensis, Bieb	. ,,	169	ceylanica, Wight	•••	"	504
hispida, Forsk	. ,,	168	echioides, Nees	,	"	505
italica, Retz		168	elongata, T. Anders.		"	502
moltkioides, Benth		170	elongata, Nees		"	502
petiolata, Hook		158	glandulosa, Nees		,,	5 05
pulla, Bieb		169	gracilis, Nees	•••	"	508
		171	lineatu, Nees	•••		504
	••	168	lobelioides, Wight		"	505
		168		····	19	508
sikkimensis, Clarke			Macrobotrys, Nees	•••	"	504
tenella, Hornom		167	Neesiana, Wight	•••	"	504
seylanica, Jacq. 1		167	Neesiana, Benth	•••	>>	
Anchusopsis longiflora, Bisch	l. ,,	159	ovata, Benth	•••	13	502
Ancistrocladus, Wall	. i.	299	paniculata, Nees	•••	"	501
attenuatus, Dyer	. 27	800	Rothii, Clarke	•••	"	506
extensus, Wall	. ,,	299	serpyllifolia, Wight		. 19	506
extensus, Wall. ?	. ,,	800	stellulata, Clarke		"	504
Griffithii, Planch	. ,,	300	stenophylla, Clarke		"	503
Heyneanus, Wall	•••	299	subspathulata, Clarke		"	502
pinangianus, Wall	•••	300	tenuiflors, T. Anders.		"	502
sagittatus, Wall	. 300		visposula, Necs		"	504
	•	300	Wightians, Arn		•••	508
stelligerus, Wall		299	Wightiana, T. Anders.	•••	",	508
Vahlii, Arn				:::	K()4	505
Wallichii, Planch		300	sp., Hk. f. & T			788
Ancistrolobus brevipes, Turo	1.	257	Androgyne sp., Griff	· ;··	▼.	100
glaucescens, Turcs	. ,,	258	Andromeda cupressiforn			450
ligustrinus, Spach	. ,,	257	Wall	•••	iii.	459
sp., Griff		299	elliptica, Sieb. & Zucc.	•••	"	460
sp, Wight	. ,,	257	fastigiata, Wall	•••	"	459
Andersonia, Ham			flexuosa, Moon		"	457
acuminata, Herb. Rottl	. ii.	451	formosa, Wall	•••	"	461
altissima, Hb. Madr		450	katagherensis, Hook.		"	457
lanceolata, Hb. Rottl		451	lanceolata, D. Don	•••	"	46L
Andersonia, Roxb			ovalifolia, Wall		"	460
ARTERIO CONTINUE AND	. ,,		· Sandistannia areases		.,	

Andromeda	Wa!	Dem	Andropogon	Vo	l. Page
squamulosa, D. Don	ii	l. Page i. 461	brevifolius, Sw	v i	i. 165
symplocifolia, Wall		AEE	1 70 11 77 11	:: -1	
villosa, Wall	••	401	brunneus, Heyne ▼	ii. 1Ó	9, 112
ANDROMEDE		i. 456	cæsius, Nees vii. 17	0. 20	5, 206
		i. 164		vi	
acicularis, Willd		100		,,,	75
aciculatus, Retz		100		,	170
aciculatus, Wight		109	l and the form of the co	, ,	108
adscendens, Heyne		949	1	,	144
albidus, Heyne	"	100	I make	,	178
Alectoridia, Steud	"	140	1741	, ,	194
Allionii, DC	"	199	1 0 n1	,,,	194
Alopecurus, Hack	"	166	1 12 1 1 10 1	,	100
alternans, Presl		179		de '	
amplexifolius, Trin	"	146		,	203
angustifolius, Parl		173		,	910
angustifolius, Sibth. & Sm.	. 99	171	37	,	905
annulatus, Forsk		196	CI 1 77 7		197
annulatus, Heyne	99 99	172		··· ,	102
annulatus, F. Schmt	97 98	171	7741	,	170
aprious, Trin		169	1	3	907
aristulatus, Hochet	"	191		,	900
armatus, Hk. j	"	197		,,,	194
Arnottianus, Nees	"	174	▼ ************************************	,	106
Arnottianus, Steud		128	The second of the second	. ,	194
aromaticus, Sieb:.	"	205	777 6	, ,	179
Arriani, Edgew	"	203	777 6	, ,	174
arundinaceus, Heyne	"	243		,	908
arundinaceus, Soop		182	Domb	•	119
ascinodis, Clarke	"	169	TT L L	•	905
asper, Heyne	"	189	l compromitive Okama	•	185
assimilis, Steud	"	179	l		100
Asthenos, Steud	. "	136		•	199
asthenostachys, Steud	"	109	7 (10 71 01 3	91	101
Aucheri, Boiss	"	195		,,	120
aureo-fulvus, Steud	22 22	114		,	1/10
australis, Poir	-	196		,,	141
avenaceus, H. B. K	"	182	D		100
axilis, Hochst	"	166	1 1 1 1 1 1 1	,,	148
barbatus, Ham	"	196	Contact Track		910
barbatus, Linn	"	292	A	11	910
barbigerus, Steud	"	127	January Change	,,	210
Barteri, Haok	"	210	2.3.17. 37	;	165
Beckettii, Thw	"	244		11	170
Bellardi, Bieb	99	199	7	,	910
bellariensis, Hack	"	201	7 7 7 7 77 . 1	. ,	107
besukiensis, Stoud		199		11	100
biaristatus, Steud	33 33	116	1 ,, ,	11	907
? bicolor, Kunth	97	184		ii . 2 0	
P bicornis, Forsk	"	205	l	vi	
bifidus, Steud		134	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	91	910
bifoveolatus, Stead	"	174	21/anima diama	,,	100
binatus, Retz	"	129	and decoupling transport	,,	149
binatus, Boxb		196	L	•••	199
Bladhii, Retz	"	196	-1-4 O43	,,	107
bootanenis, Hk. f	"	166		,,	161
breviaristatus, Steud	11	191	".a . 	,,	175
	77			11	

A J		_	1 A - 3			_
Andropogon		Page	Andropogon		Vol. 1	
	vii.		Hugelii, Hack	•••	vii.	
eriophorus, Willd	, ,,	203	humilis, Wight	•••	"	170
Esenbeckii, Steud	. ,,	127	imberbis, Stoud		"	127
excavatus, Hochst		205	impressus, Hack		19	16A
familiaris, Stend	•••	210	incertus, Steud		134,	146
fascicularis, Roab	•••	177	increscens, Stoud		vii.	198
fascicularis, Thw		176	incurvatus, Kon	•••		196
· · · · · · · · · · · · · · · · · · ·	•••	116			"	149
	. 167			•••	"	136
			inscalptus, Anderss.	•••	"	174
festucoides, Presl	. vii.		insculptus, A. Rich	•••	"	
filiculmis, Hk . f	• ,,	181	intermedius, Br	•••	"	175
filiformis, Pers	. ,,	196	involutus, Steud	•••	"	129
filiformis, Roxb	79	104	Isohæmum, Linn	•••	_ 27_	171
filipendulus, Hochst	. ,,	209	lschæmum, Roxb	₹ii.	172,	196
finitimus, Hochst	. ,,	209	ischynanthus, Steud.	•••	vii.	200
flabelliformis, Roxb		210	Iwarancusa, Jones		,,	203
flaccidus, A. Rich,		165	Iwarancusa, Boiss		"	205
Acres on None	•••	207	iavanicus, Steud	•••	•••	188
4		165	chasianus, Munro		"	206
		205	77 1 11 04 1		"	196
				•••	"	109
Foulkesii, Hk. f	. ,,	174	koretrostachys, Trin	•••	11	175
foveolatus, Del	* **	168	Kuntzeanus, Hack	•••	"	
fragilis, Br	. ,,	165	lachnatherus, Benth.	•••	**	209
fragilissimus, Hochst	, ,,	166	lancearius, Hk. f	•••	**	190
fragillimus, Steud	. ,,	166	lanceolatus, Baker	•••	,,	146
fulvus, Spreng	. 11	210	lanceolatus, Roxb	•••	3,	144
fuscus, Presl	. ,,	185	lancifolius, Trin		,,	147
gangeticus, Hack		178	laniger, Desf	•••	**	203
garipensis, Steud	•••	196	lasiocoleos, Steud	•••	"	146
geminatus, Hb. Russ	••	170	Lawsoni, Hk. f	•••	"	187
	••	127				182
	••	204		•••	"	185
genuinus, Hack		208	lazus, Willd	•••	"	176
Gidarba, Ham	• ••		leptanthus, Steud	•••	. ,,	114
giganteus, Hoohst	"	204		one.	"	
glaber, Roxb	. ,,	176	liananthus, Stoud	•••	"	200
glabratus, Steud	. ,,	188	lineatus, Steud	•••	"	136
glaucopsis, Steud	,,	179	lividus, Thw	•••	"	209
glaucus, Retz	. ,,	150	longipes, Hack	•••	,,	170
Grayia, Steud		246	Macraei, Steud	•••	,,	134
Griffithii, Munro	••	209	macrostachyus, Andersi		"	136
Griffitheiæ, Steud		128	malacophyllus, Hochst.		"	184
0 1 1 1 0L 3	••	161	Martini, Benth			205
O11- T		187	Martini, Roxb	•••	"	204
		194	Martini, Str. & Wint.		"	207
Hackelii, Hk. f	••			•••	"	206
Haenkii, Presl	. 11	176	Martini, Thw	•••	"	200
halepensis, Brot	. ,,	182	melanocarpus, Ell	•••	"	199
halepensis, Wight	"	183	messanensis, Biv	•••	"	
Hamiltoni, Hk. f	"	190	micans, Steud	•••	"	146
heteroclitus, Nees	. ,,	219	mioranthus, Kunth	•••	"	178
hemastachyus, Steud	,,,	112	microphyllus, Trin	•••	17	147
himalayensis, Steud		142	miorotheca, Hk. f		"	208
hirsutus, Heyne		70	miliaceus, Roxb		"	182
hirtiflorus, Kunth	•••	167	miliformis, Schult		"	182
hirtus, Heyne	••	170	minor, Hochst	• • • •	"	147
	••	78	minutiflorus, Steud	•••	••	112
	••	167	minutissimus, Heyne	vii.	147,	
Hochstetteri, Stend	••	209	l		vii.	
Hookeri, Munro	"	AU	molle, Duthie	•••	¥ 450	~=:

Andropogon	Vol. Page	Andropogon	Vol. Page
mollicomus, Kunth	100	pertusus, Ham	Vol. Page vii 196
monandrus, Roxb	141		" 176
monomeros, Hochst	910	I 7 1 1 0 04 3	,, 139
monostachyus, Spreng	100	P petiolatus, Dals. & Gil	
monostachyus, Stend	107	Total A Total	,, 166
montanus, Roxb	170	1 1114 (1)	" 180
montanus, Benth	100	771.1	,, 180
montanus, Koen	. 100	707213.2	" 112
monticola, Schult	" 100	1	, 138
musronatus, Anderss	100	1 7 7 64	,, 205
multicaulis, Steud	147	77 - 7	,, 194
Munroi, Clarke	`` 1/71	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,, 198
muralis, Ham	. 347		,, 202
muricatus, Retz	106	1 Damb	,, 199
murinus, Stead	. 105	7 4 4 7 7 77 - 3 - 4	,, 200
muticus, Stend	133		,, 200
nardoides, Nees vii.	.". =::	1 70 6 70 10	,, 148
Nardus, Linn	-11 005		,, 144
Nardus, Bentl. & Trim	906	77 3611	,, 209
D-441	" 196	1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,, 218
and and department Thomas II.	" 196		" 91 9
	" 105		902
and the advantage of the short	″ 90g		179
- 141 3 - 1 TT1 C	" 100	? Pseudischæmum, Duthi	178
milatida a Promato	" 195		" 187
	" 109		" 191
	190	l " et et i	" 170
· · · · · · · · · · · · · · · · · · ·	" 146	7 70 1	" •
	" 919	• • •	170
nutans, Linn	185		170
obtusifolius, Poir	" 106		" 17R
obtusus, Nees	7 190		195
obvallatus, Steud	" 177	purpureo-sericeus, Hochiquadrivalva, Linn	" 919
odoratus, Lisb	179	1	7 179
odoratus, Lish	901		" 171
oliganthus, Hochst	" 909	radicans, Lehm	188
Olivieri, Boiss	" 160	7.	" 191
Orthos, Schult	179		7 100
oryzetorum, Hack	204		100
pachnodes, Trin	170		ii. 184, 146
pachyarthrus, Hack	140		-4: 100
paleaceus, Steud	188	TO 14 . 5 1. 1. 727. P	901
pallidus, Kunth	,, 71,78		" 100
paniceus, Heyne	,, /1,/0 100		" 104
paniculatus, Lam	, 188		" •04
panormitanus, Parl	" 178		100
papillosus, Hochst	,, 197		144
parviflorus, Boxb	,, 165		,, 195
parviflorus, Wight	" 218		" 1 <i>77</i>
parvispica, Steud	, 179	1 1 m 1	, 177
patenti-villosus, Steud	, 134		, 197
pectinatus, Stoud	, 140	, , , , , , , , , , , , , , , , , , , ,	,, 172
pedicellatus, Stoud	" 185		,, 136
P pendulus, Nees	,, 206		, 180
peninsulæ, Stoud	,, 192		, 204
pentastachyus, Hoyno	,, 172		,, 2)6
perfossus, Nees	,, 176	Schenanthus, Wall. vii. 2	06,206,207
pertusus, Willd	,, 178	scoparius, Heyne	vii. 70

Ludropogon	•		Page	Andropogon Vol. Page
scrobiculatus, Kunth	•••	Vii.		sp., Hk. f. & T vii. 108
segænsis, Steud	•••	13	200	sp., Wallvii. 108, 109, 110, 112,
segetum, Stend	•••	"	128	115, 116, 130, 136, 165, 168, 170, 178, 174, 176, 178, 185, 196, 197,
Sehima, Steud	•••	,,	186	178, 174, 176, 178, 185, 196, 197,
semiberbis, Kunth	•••	"	167	200, 205, 208.
semisagittatus, S teu d.	•••	"	130	Andropogones vii. 8, 99
serratifolius, Heyne	•••	"	215	Androsace, Linn iii. 495, 672
serratus, Thunb	•••	,,	185	Aizoon, Duby ii. 497
serratus, Miq	•••	,,	179	? carnosula, Duby ,, 496
serratus, Betz		,,	196	Chammjasme, Host ,, 499
serrulatus, Link		,,	144	cordifolia, Wall ,, 500
simillimus, Steud	•••	,,	134	Croftii, Watt ,, 672
Sorghum, Brot		"	188	elegans, Jacquem ,, 496
Sorghum, Roxb		9;	183	foliosa, Duby ,, 498
speciosus, Stend	•••	,,	152	foliosa, Klatt ,, 498
Sprengelii, Kunth	•••	"	198	geraniifolia, Watt ,, 497
squarrosus, Linn. f.		17	186	globifera, $Duby$,, 500
squarrosus, Linn	•••	"	62	globifera, Klatt ,, 496
Stapfii, Hk. f		"	184	Hookerians, Klatt ,, 499
stipæformis, Steud		,,	104	incisa, Wall , 496
striatus, Klein		,,	186	Jacquemontii, Duby ,, 499
strictus, Roxb		,,	168	lanuginosa, Wall ,, 498
submuticus, Stend		"	145	Lehmanni, Wall ,, 500
subrepens, Steud		"	179	microphylla, Hk . f ,, 498
subulatus, Presi	•••	"	188	muscoides, Duby ,, 499
subunifoveolatus, Stend		"	174	obovata, Wall ,, 495
tacazensis, Stend	•	"	186	parviflora, Jacquem ,, 496
tenellus, Presi		"	165	patens, Wright ,, 496
tenellus, Roxb			196	primulina, Spreng ,, 492
tetra-aristatus, Roxb.		"	292	primuloides, D. Don ,, 499
timorensis, Steud		"	136	primuloides, Duby ,, 498
Tong-dong, Steud	•••	;,	128	rotundifolia, Hardw ,, 496
And the Amazin The sta	•••	"	149	
mututt Occurs	•••	"	198	AQQ
trispicatus, Bohult	•••	"	112	
Autoliant mark	•••	17	112	Galarra TTI 6 % M
	•••	"	169	sempervivoides, Jacquem. ,, 497
	•••	"	200	A05
		"	185	400
tropicus, Spreng tuberculatus, Hack.	•••	"	168	
7 77 4 97	•••	"	220	21 7 400
	•••	"	67	villosa, Jacquem ,, 1956 Androscepia anathera, An-
	•••	"	172	
	•••	"	176	016
Vachelii, Nees	•••	"	194	alabasis Andones 916
velutinus, Hk. f	•••	"	178	
venustus, Thw	•••	"	205	4manus 1 Amalanaa 914
versicolor, Nees	•••	"	189	4 1 11 111 11 1100
verticillatus, Rosb	•••	**	179	4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
villosulus, Steud	•••	**	179	A 11 50 -1 07/
villosus, Lamk	•••	>>	117	manufacatinia Wanath 990
vimineus, Trin	•••	"		7: 1 4 D.1
violaceus, Heyne	•••	11	146	· · · · · · · · · · · · · · · · · · ·
virene, Spreng	,	**	78	, , , , , , , , , , , , , , , , , , ,
Wightianus, Steud.	•••	99	191	O-10 990
Woodrovii, Hk. f	•••	"	178	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
zoylanious, Nees	•••	"	192	, , ,
seylanicus, Arn	•••	22	167	debile, Wall ,, 879

Aneilems		Vol.	Paga	Aneilema	Val	Page
densifiorum, Kunth		vi.		serotinum, D. Don	. vi.	Page 375
diandrum, Ham	•••	,,,	379	sinicum, Lindl		379
didymum, Wall	•••	. 11.	368	spectabile, Kurz		375
dimorphum, Dals		, ,,	377	spicatum, Wall		375
dimorphum, Thw		,,,	37 6	spiratum, Br		377
divergens, Clarke		,,	876	terminale, Wight		379
diversifolium, Hassk.	•••	,,	379	Thomsoni, Clarke		376
elatum, Kunth	•••	,,	377	trichocolea, Schau		879
ensifolium, Wight	•••	,,,	379	triquetrum, Wall		878
esculentum, Wall	٧i.	377,		tuberosum, Ham	. ,,	375
filiforme, Ham		₹i.	381	vaginatum, Br	. ,,	381
foliosum, Hasak		,,	379	versicolor, Dals	. ,,	378
giganteum, Br		"	879	zeylanioum, Clarke	. 19	376
glaucum, Thw	• • • •	**	375		. 376	
gramineum, Br	•••	"	377	sp., Miq	. v i.	377
Hamiltonianum, Wall.			380	sp., Wall		368
herbaceum, Wall	٧i.	877,		Anemagrostis Neesiana, W		
hispidum, D. Don	•••	∀i.	890	& A	. vii.	
Hookeri, Clarke	•••	"	376	tenella, Wight	. ,,	71
Junghuhnianum, Miq.	•••	"	879	Anemone, Linn	. i.	7
Kœnigii, Wall	•••	"	881	albana, Stev	. ,,	7
lancifolium, Griff	•••	"	379	biflora, DC	. ,,	7
lanuginosum, Wall.	•••	"	380	curta, Wall	. ,,	2
latifolium, Wight	•••	"	377	cynosurus, Griff	. ,,	16
lineolatum, Kunth	•••	"	376	demissa, Hk. f. & T	. ,,	9
longifolium, Hook	•••	"	379	discolor, Royle	٠,,	8
longifolium, Wall	•••	"	376	dubia, Wall	. ,,	.9
loriforme, Hasak	•••	"	879	elongata, D. Don	. ,,	10
Loureirii, Hance	•••	"	375	Falconeri, Thoms	. ,,	8
? melanostictum, Hance	•••	"	377	geraniifolia, Wall		9
minutum, Kunth	•••	73	379	Gortschakowii, Kar. & Kir	٠,,	7
montanum, Wight	•••	"	381 376	Govaniana, Royle	•••	9
montanum, Thw	•••	17	877	Govaniana, Wall	• • • • • • • • • • • • • • • • • • • •	8.
nanum, Kunth	•••	"	379	Griffithii, Hk. f. & T		8
nudicaule, Kunth	•••	"	3 78	hispida, Wall	•••	9
nudiflorum, Br	-::	877,		longiscapa, Wall		8
nudiflorum, Miq	₹i.	vi.	381	77'- 977-13	•	8
nudiflorum, Wall	•••		378			10
nummularium, Miq	•••	"	380	alabaratista D. Dan		8
ochraceum, Dalz ovalifolium, Hk. f	•••	"	382			9
777 11	•••	"	882	mundamaia Timm	• • • • • • • • • • • • • • • • • • • •	7
paniculatum, Wall	•••	"	381	_iii		ģ
paniculatum, Wight	•••	"	877	rivularis, Ham		10
pauciflorum, Wight		"	378	rupestris, Wall		9
pauciflorum, Dals	•••	33	881	rupicola, Camb		8
pilosum, Wall	•••	"	880	scaposa, Edgew	•••	ğ
protensum, Thw	•••	"	876	tetrasepala, Royle	• • • • • • • • • • • • • • • • • • • •	10
protensum, Wall		"	382	trullifolia, Hk. f, & T.	••	9
radicans, D. Don	•••	"	878	villosa, Royle	•	ğ
reniforme, Ham	•••	"	868	vitifolia, Ham		8
scaberrimum, Kunth	•••	"	882	Wallichiana, Royle		7
		"	875	Wightiana, Wall	•••	ÿ
scapiflorum, Wight scapiflorum, Hk. f. & T.		"	376	ANEMONEE	ġ.	ĭ
secundiflorum, Kunth	•••	27	868	Anerincleistus, Korth	••	529
secundum, Wight	•••	"	879	Griffithii, Hk. f		529
semiteres, Dalz	•••	"	8 81	Helferi, Hk. f		529

	Vol.	Page	Anisochilus	Vol.	Page
Anethum Fæniculum, Linn.	ii.	695	Wightii, Hk. f	. iv.	628
graveolens, Linn	**	709	Inisodus humilis, Hk. f.	iv.	242
Panmorium, Roxb	19	695	luridus, (luridans) Link &	Ł	
Sowa, Roxb	1)	709	Otto`	. ,,	248
trifoliatum, Roxb	12	685	stramonifolius, G. Don		243
Angelica, Linn	íí.	706	Anisomeles, Br		672
Archangelica, Linn	"	707	candicans, Benth	. ,,	673
? Candollii, Wall	"	700	disticha, Heyne		672
glauca, Edgew	,,	706	glabrata, Benth		672
Angræcum pugioniforme, Klotz		70	Heyneana, Benth		672
seylanicum, Lindl	,,	78	intermedia, Wight		673
Anguillaria, Gaerto.	•		\mathbf{m} alabarica, Br		673
zeylanica, Gaertn	iii.	523	mollissima, Wall		672
Anguillaria, Br.			nepalensis, Spreng	. ,,	672
Heyneana, Wall	٧i.	357	ovata, Br	. ,,	672
indica, Br	,,	357	Anisonema dubium, Bl	▼.	288
indica, Grah	29	357	eglandulosum, Done	. ,,	288
ANGUILLARIER	vi.	301	intermedium, Done		288
Ania angustifolia, Lindl	₹.	819	multiflorum, Wight		288
bicornis, Lindl	,,	820	reticulatum, A. Juss		288
latifolia, Lindl	"	820	Zollingeri, Miq	. ,,	288
? latifolia, Wight	•	821	Anisopetalum Careyanum, H		760
maculata, Thw v.	784.	822	lasianthum, Kuhl	. ,,	763
Anictoclea Grahamiana,	•				441
Nimmo	ii.	657	distichs, Hook	. ,,	442
Anisadenia, Wall	i.	412	grandifolia, G. Hensl. ii.	442, iv	r. 86
khasyana, Griff	,,	412	Griffithii, Oliv	íi.	442
pubescens, Griff	"	413		,,	442
saxatilis, Wall	,,	412	ANISOPHYLLEÆ	. ii.	435
Anisantha pontica, C. Koch	vii.	359	Anisophyllum Burman-		
Aniseia, Chois	iv.	200	nianum, Kl. & Gar	v.	252
Afzelii, G. Don (Ariseia)	,,	217	Forskalii, Kl. & Gar	,,	252
barlerioides, Chois	"	201	thymifolium, Kl. & Gar	,,	252
bracteata, Hassk. (Ariscia)	,,	217	Anisoptera, Korth	i.	300
calycina, Chois	"	201	nlakaa V	,,	301
uniflora, Chois	,,,	201	oblonga, Dyer	,,	301
Anisochilus, Wall	i₹.	627	1 17	,,	301
adenanthus, Dalz. & Gibs.	"	630	Anneslea, Wall	i.	280
albidus, Wight	"	628	77 1	,,	280
carnosus, Wall	"	627	fra 117-11	,,	280
crassus, Benth	33	627	Anneslia spinosa, Roxb	i.	115
decussatus, Dalz. & Gibs.	,,	62 8		i.	321
dysophylloides, Benth	,,	62 8		. ,,	321
eriocephalus, Benth	,,	627	Anodendron, A. DO	iii.	668
glaber, Schrad	"	627	Candolleanum, Wight .	,,	669
pallidus, Wall	,,	629	paniculatum, $A.DC.$.	,,	668
paniculatus, Benth	,,	628	$\mathbf{pauciflorum}, Hk. f. \dots .$,,	669
plantagineus, $Hk.f.$,,	628		,,	669
polystachyus, Benth	"	630	rubescens, Teysm. & Binz	1. ,,	669
purpureus, Wight	"	628		ii.	450
robustus, $Hk. f.$,,	629	1	,,	450
rupestris, Wight	"	627	hirta, Wall	,,	450
scaber, Benth	"	627		,,	450
sericeus, Benth	"	629	myrtifolia, Wall	,,	451
suffruticosus, Wight	,,	628	pendula, Edgew	. "	451
suffruticosus, Thw	"	63 0	phillyremfolia, Heurck		
verticillatus, Hk. f	,,	629	Muell	,,	451

Anomanthodia, Hk. f	, jii	. 108	Anthemis, Linn	. iii.	812
auriculata, Hk. f	. ,,	108	Cotula, Linn		812
Anomosanthes deficiens, Bl		671	odontostephana, Boiss	•••	812
Anomospermum excelsum,			pygmæa, Bert		316
Dals	. v.	282	scaposa, Gay		812
Anons, Linn		78	Anthericum adenanthera,	. ,,	
reticulata, Linn		78	Forst	. vi.	337
	•••	78	nepalense, Spreng		385
A	27.2		1	••	386
A		45	0.1.14	•••	836
_ · · · · · · · · · · · · · · · · · · ·	_,				334
Anosporum, Nees		597	ornithogaloides, Hochst		386
Cephalotes, Kurs	•••	597	parviflorum, Benth		854
monocephalum, Nees	•••	598	serotinum, Linn	• • • • • • • • • • • • • • • • • • • •	884
pallidum, Boeck	•;•		tuberosum, Heyne		
Anotis, DU	. iii		tuberosum, Rozb vi		385
calycina, Hk. f	. ,,	78	unistorum, Roxb		855
capitata, Korth		63		vii.	210
carnosa, Hk. f	. ,,	74	anathera, Nees	. ,,	215
decipiens, Hk . f	. ,,	72	arguens, Willd	• ,,	211
foetida, Dals	, ,,	74	arguens, Heyne	. ,,	214
gracilis, Hk. f	. ,,	71	arguens, Wight	. ,,	218
ingrata, Hk . f	. ,,	71	arguta, Nees	. ,,	218
lancifolia, Hk. f	. ,,	78	arundinacea, Hack	. ,,	217
Leschenaultians, Hk. f	. ,,	72	arundinacea, Hasak	. ,,	211
monosperms, Hk . f	. ,,	75	arundinacea, Roxb	. ,,	217
Montholoni, Hk. f	"	78	australis, Br	. ,,	218
nummularia, Hk. f		75	barbata, Dest		218
oxyphylla, $Hk.f.$		72	caudata, Hack vii.	216,	217
quadrilocularis, Hk. f		74	caudata, Nees		217
Rheedii, Hk. f		78	ciliata, Linn. f		218
Richardiana, Hk. f	••	75	ciliata, Munro	•	218
Ritchiei, Hk. f		74	ci/iata, Rets	•••	212
urophylla, Hk. f		72	ciliata, Thunb		218
Wightiana, Hk. f		75	cimicina, Edgew	••	218
Anplectrum, A. Gray	•••	545	cymbaria, Rosb	••	215
annulatum, Triana		546	Annatau Indo Mhan	•	209
	•••	546			212
No. 1 . Acres 100 . Acres 1		546			211
	•••	545	frondosa, Br		217
cyanocarpum, Kurz	••	546	genuina, Hack		
divaricatum, Triana	•••		gigantea, Cav	••	216
glaucum, Triana		545	gigantea, Cav		217
pallens, Bl		545	gigantea, Hack	-	216
parviflorum, Benth		528	Helferi, Munro	"	214
Anquetilia Laureola, Done		499	heteroclita, Roxb	• 99	219
Anstrutheria seylanica, Gard		441	Hookeri, Griseb	• ••	216
Antennaria, <i>Gaertn</i>	iii.	278	imberbis, Rets	99	211
cinnamomea, DC	, ,,	281	imberbis, Rets	• ••	218
contorta, D. Don	,,,	285	Junghuhniana, Nees	,,	211
hyperborea, D. Don	,,	264	laxa, Anderss	>>	218
muscoides, Hk. f. & T		278	Linnwana, Steud	,,,	218
nana, Hk. f. & T		278	longispatha, Hack		217
Timmua, D. Don		281	mutica, Stend		217
triplinervis, Sims		281	pilifera, Steud		211
villosissima, D. Don, lapsu			P polystachya, Rozb		212
Gnaphalium		283	prostrata, Willd		218
Antheischima, excelsa, Korth		291	P puberula, Anderse		218
ANTHEMIDER iii.			scandens, Ruxb	•	218
			,, , , , , , , , , , , , , ,	• ,,	

Anthistiria	37-1	T	Antidesma	T/al	Page
17 11 57		Page 213	/ M-1	_	359
		214			860
	"	217	1 ,, , ,		861
subscricans, Nees Thwaitesii, Hk. f	,,	215	A 13 W/ 21		359
	,,	214	# m-1	-	860
tremula, Nees	"	217		••	358
villosa, Hack	"	217	floribundum, Tulasne		360
villosa, Poir	**	212	fruticulosum, Kurz	•••	357
vulgaris, Hack	"		Ghesembilla, Gaertn	•	358
vulpina, Anderss	"	217	glabrum, Tulasne	. ,,	
Wightii, Nees	.,,	218	Helferi, Hk. f	,,,	357
sp., Wall vii. 206,	ziz,	213,	khasianum, Hk. f	• ,,	862
214, 215, 217, 218, 219.		000	Kingii, Hk. f	• ,,	856
ANTHOBOLE	₹.	229	lanceolarium, Wall		361
Anthoosphalus, A. Rich	iii.	23	lanceolatum, Dalz. & Gibs	• ,,	864
Cadamba, Miq	19	23	lanceolatum, Hk. f. & T.	,,	362
chinensis, Hasak	"	26	leptocladon, Tulasne		362
indicus, Rich	,,,	26	leucooladon, $Hk. f$, ,,	858
morindæfolius, Korth	,,	23	longipes, Hk. f	. ,,	855
Anthocometes aristatus, Nees	iv.	524	lunatum, Miq	. ,,	852
Anthogonium, Lindl	₹.	822	macrophyllum, Wall	, ,,	863
gracile, Lindl	"	822	martabanicum, Presl		363
Griffithii, Robb. f	"	823	Menasu, <i>Miq</i>		364
sp., Griff	"	823	? Menasu, Gamble		363
Anthoxanthum, Linn	vii.	221	Menasu, Kurz		864
indicum, Linn	,,	98	Menasu, Muell	-	363
odoratum, Linn	"	222	minus, Bl.?		362
Anthrisous, Hoffm	iï.	692	molle, Wall		356
nemorosa, Spreng	,,	692	montanum, Thw		862
Anthyllis cuneata, Dum	íí.	142	Moritzii, Muell		362
A	₹.	537			485
7 1 ·		587			358
	"	587	neurocarpum, Miq nigricans, Tulasne ▼		365
	"	538			865
	"	538	l - Lla 1/ 1/ 1/		365
rufa, Miq saccidora, Dalz	"	587	oblongifolium, Bl v	. 362,	
	,,	587	l " '		364
toxicaria, Leschen	."	249.	oblongum, Wall		855
Anticharis, Endl	iv.	249	pachystachys, Hk. f		857
glaudulosa, Aschers	"	250	paniculatum, Roxb	**	361
linearis, Hochst	"		parviforum, Ham		
Antichorus depressus, Linn.	i.	398	pendulum, Hk. f	٠,	856
Antidesma, Linn	V.	354	persimile (perserrula),		365
	357,		Kurz pubescens, Hk. f. & T		864
acuminatum, Wall	₹.	363			362 .
alatum, Hk. f	"	858	pubescens, Moritz	"	
Alexiteria, Linn	"	859	pubescens, Roxb	• • •	357
P Alexiteria, Gaertn	"	864	pubescens, Tul	, ,,	368
Alexiteria, Prosl	38	362	puncticulatum, Miq	,,,	366
andamanioum, Hk. f	19	864	pyrifolium, Muell	, ,,	362
assamicum (nom. delend.)	A9	868	refractum, Muell	,,,	363
attenuatum, Wall	",	856	Protatum, Muell	"	360
brunneum, Hk. f	"	859	Rozburghii, Wall	"	357
Bunius, Spreng	17	858	salicifolium, Miq	. ,,	366
Bunius, Miq	,,	364	simile, Muelt		868
Bunius, Wall v. 358,	360,			. 857,	
ciliatum, Presl	₹.	858	sylvestre, Wail	₹.	861
comptum, Tulasne	99	365	Thivaitesianum, Muell	• • •	858
? coriaceum, Bl	,,	852	tomentosum, Bl	"	856
			-		

A-Al-Anson					r-1	D
Antidesma		Page 356	Aphyllorchis, Bl		voi.	Page 116
velutinosum, Bl	▼.					116
velutinum, Tulasne	"	861	montana, Rchb. f	•••	"	
Wallichianum, Presl	"	361	pallida, Bl	•••	"	117
Wattii, <i>Hk. f.</i>	"	366	Prainii, Hk. f	•••	"	117
seylanicum, Ham	"	368	? vaginata, Hk. f	•••	"	117
seylanicum, Lamk	,,	859	Apios, Manch	•••	ii.	188
Antidesma sp., Wall. v. 355,	856 ,	357,	carnea, Benth		"	188
358, 359, 860, 361, 362, 8	364,	440,	Apium, Linn		ii.	678
619.	•		graveolens, Linn		"	679
Antidesmee ?, Fin	₩.	619	involucratum, Roxb.		"	682
		784	Aplotaxis albescens, DC.	•••	iïi.	874
	iv.	246				877
	iv.	253		•••	"	374
		253	1	•••	"	373
gibbosum, Wall	,,			•••	"	369
glaucum, Stocks	"	252	cæspitosa, DC	•••	77	
gratissimum, Roxb	"	266	candicans, DC	•••	17	878
hexandrum, Forsk	,,	279	Candolleana, DC	•••	"	372
majus, Linn	"	253	carthamoides, Ham	•••	"	3 78
minus, Linn	"	252	cirsioides, DC	•••	"	862
Orontium, Linn	"	253	deltoides, DC		"	874
papilionaceum, Burm	,,	252	denticulata, DO		"	875
Antirrhosa, Comm	iii.	126	discolor, DC			372
Antistrophe, A. DC	iii.	531	fastuosa, Done,		"	375
41 . A DC		532	A-11 79 7	•••	"	373
	,,	532	gnaphalodes, Royle	•••	"	377
serratifolia, Hk. f	"	=		•••	"	376
Antitaxis, Miers	ì.	106	gossypina, DC	•••	"	
fascioulata, Miers	."	106	Jacea, Klotz	•••	"	875
Antonia Griffithii, Wight Aopla reniformis, Lindl	iv.	85	Lappa, Done	•••	"	876
		152	leontodontoides, DC	•••	"	369
Apama siliquosa, Lamk	v.	73	multicaulis, DC	•••	"	373
Aparisthmium javense,			nepalensis, Spreng	•••	"	87 0
Hassk	v.	422	nivea, DC		,,	375
sumatranum, Rohb. f. &			obvallata, DO		"	365
Zoll	"	421	? pungens, DC		"	362
Apaturia Lindleyana, Wight	₹.	812	Roylei, DO		"	870
montana, Lindl	,,	812	scaposa, Edgew	•••	"	373
montana, Thw	Ϋi.	117	sorocephala, Schrenk	•••		877
senilis, Lindl	٧.	812	Apluda, Linn		vii.	
		812	aristata, Hack			150
Aperula assamica, Meissn	"	182		•••	. "	150
	₹.	182		•••	33	150
Meissneri, Herb. Calc	"		aristata, Linn	•••	"	
Neesiana, Bl	"	186	ciliata, Anderss	•••	"	151
oxyphylla, Meissn	"	183	communis, Nees & Arn.	•••	"	151
Apetalon minutum, Wight	Vi.	122	Cumingii, Buese	•••	"	150
Aphanamizis rubiginosa,	_		geniculata, Roxb	•••	"	150
Griff	i	561	gigantea, Spreng	٠.,	"	150
Aphananthe cuspidata,			? glauca, Schreb	•••	,,	150
Planch	v.	486	Gryllus, Beauv		"	151
Aphanochilus blandus, Benth.	iv.	644	Gryllus, Presl		,,	188
eriostachys, Benth	22	645	humilis, Kunth	•••		150
flavus, Benth		648	inermis, Regel		"	150
Z-4 Danil	**	644			"	151
javens, Denva	"	644		•••	"	150
incisus, Benth	99		mucronata, Steud	•••	"	
paniculatus, Benth	77	644	mutica, Hack	•••	"	150
pilosus, Benth	"	644	mutica, Auot	•••	"	150
polystachyus, Benth	"	648	mutica, Linn	•••	"	150
Aphylleia erubescens, Champ.	₹i.	558	rostrata, Arn. & Nees	•••	"	151
_						

Apluda	Vol.	Page 1	Aporosa	,	7.1 1	20.00
•		128	" 1 4 10 TTT 4		/ol. 1 ▼.	847
		151	71 160 1 11 TTL 2			358
. '	,,	150		•••	"	351
77 7 7 1	•• ,,	151	lanceolata, Kurz	•••	"	850
Managara Ambi	•• >>	60	1-A28-32- 771	•••	"	347
	i. 150,		T 1 11 ' 11 111	•••	"	349
A	. ••	142	1 D it	•••	"	852
Apocopis, Nees		142		•••	"	346
	,,	148	macrophylla, Muell.	•••	"	248
	•• ,,,,	148	Maingayi, Hk. f	•••	"	846
1123- 727- 4	,,	143	microcalyx, Hassk	•••	"	850
pallida, Hk. f	•• ,,	142	microsphæra, Hk. f	•••	"	849
	. ,,	143	microstachya, Muell.	•••	"	851
	•• ,,	142	microstachya, Kurs	•••	"	850
	,,		nervosa, Hk. f	•••	"	847
	,,	148	nigricans, Hk. f	•••	"	348
	,;,	142	oblonga, Muell	•••	"	
	iii.	621	Planchoniana, Baill.	•••	"	850
	iv.	64	Roxburghii, Baill	•••	22	847
sp., Wall	iii.		sphærocarpa, Muell	•••	"	349
	iii.	657	stellifers, Hk. f	•••	"	352
	,,	669	Thwaitesii, Baill	•••	"	351
	iv.	6	Tulasneana, Baill	•••	"	849
reticulatum, Herb. Mad	r. "	11	villosa, Baill	•••	"	345
tiliæfolium, Lamk	,,	46	villosula, Kurz	•••	19	847
venetum, Linn	iii.	657	Wallichii, Hk. f	•••	"	350
Apodytes, E. Mey	i.	587	sp., Griff	•••	"	353
andamanica, Kurs	',,	588	sp., lapsu A. porosa	•••	i.	288
Beddomei, Mast	,,	588	Aporum anceps, Lindl.	•••	v.	724
Benthamiana, Wight .	,,	588	concinnum, Lindl		,,	724
C - 1 - 1 - 1 - 1 - 1 - 1 - 1	,,	588	cuspidatum, Wall	•••	"	724
A 11 i 17	., Ÿ.	121	indivisum, Bl		"	723
Arnottii, Nees	,,	121	indivisum, Lindl		,,	728
zeylanica, Thw	,,	124	Jenkinsii, Griff	•••	22	725
Aponogeton, Thunb	vi.	564	Leonis, Lindl		"	723
crispum, Thunb	,,	564	micranthum, Griff	•••	"	728
echinatum, Roxb	,,	564	Serra, Lindl	•••	"	723
flavidum, Ham	,,	564	sinuatum, Lindl		79	724
lucens, Hb. Madr	,,	564	subteres, Griff		"	726
	,,	565	Apostasia, Bl		vi.	174
managan a sa a sa a sa a sa a sa a sa a s	,,	564	Brunonis, Griff		"	175
	,,	564	latifolia, Rolfe		"	175
J	,,	564	nuda, Br	•••	"	175
A A	ï.	674	Wallichii, Br	•••	"	175
A 707	v.	345	Apoterium, Bl		i.	271
	,,	848	Appendicula, Bl		₹i.	82
-4"-'- To-ill	,,	349	bifaria, Lindl	•••	"	82
amman IIIk f	,,	351	callosa, Bl		"	83
aunita Mia	,,	846	cordata, Hk. f	•••	,,	88
77 Ali 1 777 A		852	cristata, Bl	•••	"	85
	,,	848	cyathifera, Rohb. f	•••	"	83
Clallands: TTL 4		348	echinocarpa, Hk. f	•••	"	85
C		346	graminifolia, Teysm. & 1			85
21-1 M11		348	Hasseltii, Wight		٧.	824
0-1-10 TEL 0		352	Kœnigii, Hk. f	٧i.	84,	
A -10-11- To -/11	••	346	lancifolia, Hk. f		vi.	84
A	••	351	Lewisii, Griff	•••		83
-lab-Malla F	,,	349	longifolia, Bl	•••	"	85
glabritona, Aurz	,,	- ZO		•••	"	-

Appendicula		D		
"N -! 1772 £	.oi•	Page 85	Arachnanthe, Bl vi.	T.
Maingayi, Hk. f				
reduplicata, Rohb. f	* ***	82	bilinguis, Benth ,,	28
stipulata, Griff	* **	83	Cathoartii, Benth ,,	27
teres, Griff		85	Clarkei, Rolfe ,,	28
teres, Griff	v.	825	Maingayi, $Hk. f.$,,	28
torta, Bl	٧i.	84	moschifera, Bl ,,	28.
xytriophora, Rchb. f	. ,,	84	Arachnis moschifera, Bl vi.	28.
sp., Griff		85		111
Apteron, Kurz	•	643		721
lanceolatum, Kurz		643	ammata Sam	728
Apteuxis trinervis, Griff	•	55 L	hiningstidde Claube 7	722
		249	ancheminica Dens	22
A 11 1 7 7		199	abinancia Tima	28
		199	1	
Agallocha, Romb	"			22
malaccensis, Lamk	"	200	1 wayacaca, 15020 ,, ,,	729
ovata, Cav	"	200		738
AQUILABIEE	v.	192	, , ,	28
Aquilegia, Linn	i.	23	glomerulata, Bl ,, 7	187
alpina, Linn	,,	24	latifolia, W. & A ,, 7	27
fragrans, Benth	"	24		722
glandulosa, Fisch	"	24	malabarica, Bedd ,, 7	22
* 1 * 1 * 1		24		23
	"	24		86
jucunda, Fisch. & Mey	"	24		24
kanawarensis, Camb	,,	= -		
Moorcroftiana, Wall	"	24	, , ,	21
olympica, Boiss	"	24	,,, , , , , , , , , , , , , ,	23
pubificra Wall	,,	24		593 :
pyreniaca, DC	,,	24		720
viscosa, Gouan	27	24	Araliad, sp., Hk. f. & T. ii. 723, 7	28,
vulgaris, Linn	"	24	724, 726, 728, 729, 730, 73	32,
vulgaris, DC	"	24		38,
Aquilicia Ottilis, Gerto		667	789, 740.	,
sambucina, Linn		667		25.
A	ï.	128	l minmasifednum Win /	25
	i.	135	A.S	20
Arabis, Linn		136		
albida, Stev	"			85
alpina, Linn	"	135		344
amplexicaulis, Edgew	99	136		27
arenosa, Linn	"	136	minutissimum, Hk. f, 2	27
Aucheri, Boiss	,,	135	Archangelica, Hoffm ii. 7	07
auriculata, Lamk	"	135	decurrens, Ledeb ,, 7	'07
glabra, Crants	"	185		07
glandulosa, Kar. & Kir	"	136		98
heleophila, DC	"	140		94
incanescens, Munro		140	Arctium, Linn iii. 3	
0.1 / 4	"	149	Tanna Tima	59
22 1	"	185		26
Montbretiana, Boiss	"	187		
nuda, Belang	"			18
perfoliata, Lamk	"	135		28
pterosperma, Edgew	"	136		27
scapigera, Boiss	,,	187	,, ,, ,,	21
taraxacifolia, Anders	"	186	anceps, Wall ,, 5	20
Thaliana, Linn	"	148	andamanica. Kurs 5	21
Thomsoni, Hk. f	"	136		30
tibetics, Hk. f. & T	"	136	attenuata, Wall 5	28
Arachis fruticosa, Retz	ïi.	148		12
hypogæa, Linn		161	0 D1 D 4.0	15
in Management Transition	"	,1	r Basaat, E. & S ,, 5	

Amdinia			A
Ardisia	Vol. P		Ardisia Vol. Page
D1		528	oblonga, A. DC iii. 521, 528
D. J. J. J. A. D.C.	•••	520	obovata, Bl ili. 530
	,,	519	odontophylla, Wall , 525
	•••	526	ovata, Thunb ,, 520
	,,	521	oxyantha, Wall ,, 532
	,,	520	oxyphylla, Wall ,, 528
	,,	520	paniculata, Roxb ,, 519
	,,	52 0	pauciflora, Heyne ,, 529
crassa, Clarke	,,	518	pauciflora, Heyne? ,, 522
crenata, Rorb	,,	524	pedunculata, Roxb ,, 522
crenulata, Lodd		524	pedunculosa, Wall ,, 523
crispa, A. DC		524	pedunculosa, Wall ,, 528 pedunculosa, Wall ,, 522
cymosa, Bl		529	polycarpa, Wall ,, 520
densa, Miq		524	polycephala, Wall ,, 529
A (11 1		522	polycephala, Wight " 530
31 D1		521	polyneura, Miq ,, 520
J	,,	521	molecticia Min 594
alamana Amali	••	524	nomen Clarka 599
-11/4/ D-44	,,	530	mumila RI 519
	,,,	531	municiala Tools " 801
	,,	530	munctulosa Diaen 591
40		519	mumuman Daine "K10
	•••	522	munamidalia Dath 590
	"	521	cuinquenenterie 4 DC 899
-1-1 D1		525	quinquangularis, A. DC ,, 522
	,,		reflexa, Wall ,, 527
		524	rhomboidea, Wight ,, 529
		538	rhynchophylla, Clarke , 529
		520	rigida, Kurs ,, 519
		526	rostrata, Hassk ,, 530
	••• ,,	523	Rothii, A. DC ,, 520
	,,	519	Rozburghiana, Dietr ,, 588
Helferiana, Kurz	,,	526	salicifolia, A. DC ,, 530
	••• ,,,	529	sanguinolenta, Bl ,, 520
hymenandra, Wall	,,	532	sanguinolenta, Wall , 528
Icara, Ham	,,	523	serratifolia, Bedd ,, 582
	,,	528	serrulata, Kurz ,, 523
jambosioides, Miq		519	solanacea, Roxb ,, 580
		521	speciosa, Bl ,, 519
Keenani, Clarke		526	? spicata, Wall ,, 518
Librariana Ollandra		527	• tavoyana, A. DC ,, 525
Trust alabama Cab		531	Teysmanniana, Scheff ,, 531
77		525	thyrsiflora, D. Don ,, 522
lamanalata Dank		519	Tsjeriam-Cottam, R. & S , 515
1 41 1 12 O1	,,	524	tuberculata, Wall , 521
Free Town and All A. DO	••	519	umbellata, Roth ,, 580
1 ** 4 · · · · · 2 * · · · A · · · Å · ·	,,,	580	undulata, Clarke ,, 524
Tables Olaska		529	arantita Wall 505
777.37	•••	524	-illana Dank KOK
macroballa Wall		526	reinana Value 594
	••• "	527	Wallishii 4 DC 899
		519	Wallishii Mhaa
missionis, Wall	•• "	525	
mollis, Bl	,,		Innies Olemba #90
	•••	523	# 11: A TOO!
	,,	519	
		522	
		521	sp., Hk. f. & T. iii. 519, 528, 524,
noriifolia, Kurs	' 99	522	527, 528, 529.

	v	ol.	Page	Arenaria	Vol.	Page
Areca, Linn	•••	٧i.	405	tenera, Edgew	. i.	242
	•••	"	414	trichotoma, Royle mss	. ,,	235
Catechu, Linn	•••	"	405	Wallichiana, Ser	. ,,	239
concinna, Thw	•••	"	406	Arenga, Labill	. vi	
costata, Kurz		"	409	Griffithii, Seem	. ,,	421
		,	411	obtusifolia, Mart	. ,,	421
	٠ ١	vi.	409	saccharifera, Labill	. ,,	421
	•••	,,	408	Westerhoutii, Griff	. ,,	421
	•••	"	405	Wightii, Griff		422
gracilis, Roxb	•••	"	407	Arcthusa bengalensis, Hort	t. vi.	122
	• • •	,,	410	ecristata, Griff	. ,,	122
	• • •	"	406	plicata, Andr	"	119
	•••	"	415	Argemone, Linn	. i.	117
	•••	"	405	mexicana, Linn		117
	• • •	,,	408	Argostemma, Wall	. iii.	42
	•••	"	410	acutum, Wall	. ,,	43
	•••	"	406	calycinum, Br	. ,,	47
	•••	"	412	connatum, Dalz	. ,,	43
Nibung, Mart		,,	414	courtallense, Arn	٠,,	42
oryzæformis, Gærtn.	•••	,,	409	Elatostemma, Hk.f	. ,,	45
paradoxa, Griff	•••	,,	411	glaberrimum, Dalz		43
	••	,,	412	humile, Wall		44
tigillaria, Jack	. ,	,,	414	inæquilaterum, Benn		46
triandra, $Roxb$,,	406	khasianum, Clarke		43
triandra, Roxb.?		,,	407	Kurzii, Clarke		45
Wallichiana, Mart		,,	416	Lobbii, <i>Hk. f.</i>		44
<i>sp.</i> , Griff v	i. 40	07,	410	oligantha, Kurz	, ,,	46
Areceæ	v	i.	403	ophirense, Maingay		45
A	j	i.	235	Parishii, Hk. f		44
Benthami, $Edgew.$,,	242	parvifolium, Benn		45
ciliolata, Edgew			240	pictum, Wall	,,	43
d ebilis, Hk . f			242	pumilum, Benn		44
densissima, $Wall.$,	,	239	rostratum, Wall	"	44
festucoides, Benth	••	,,	236	sarmentosum, Wall		42
flaccida, Roxb	;	,,	243	soneriloides, Kurz		46
foliosa Daula		,,	236	spinulosum, Clarke	• ••	46
		,,	240	tavoyanum, Wall		43
globiflora, Wall	;	,	238	unifolium, Benn	"	45
C = 1402 A L !! D = !		,	237	unifolium, Kurz		45
holosteoides, Edgew	,	,	241	verticillatum, Wall	11	43
? imbricata, M. Bieb	,	,	237	verticillatum, Wall	,, 4	3,44
juniperina, Fenzl	,	,	236	Argyreia, Lour	i₹.	184
kashmirica, Edgew.	,	,	236	acuta, Lour	,,	186
melandryoides, Edgew		,	241	aggregata, Chois	"	191
Meyeri, Boiss		,	236	alulata, Miq	"	21 2
	,	,	238	ampla, Chois	. 22	185
musciformis, Wall	-	,	237	argentea, Chois	"	185
		,	239	barbigera, Chois	"	194
auhiaulaka Daula		,	240	Bona-nox, Sweet	"	184
oreanhile Wh f	•		238	bracteata, Chois	"	188
polytrichoides, Edgew	•	,	237	capitata, Brand	"	198
	. ,		238	capitata, Chois	"	198
makes at the line of Disk	. ,	•	240	capitata, Kurs	"	193
auhaa Timm	. ,	•	244	Choisyana, Wight	"	190
rupifraga (rupicola), Fenz	-1		243	Choisyana, Wight	"	189
serpyllifolia, Linn			239	courtallensis, Wight	"	189
Stracheyi, Edgew		•	240	cuneata, Ker	"	191
	,	•		,	77	

	v						
Argyreia			Page	Arisema			Page
		iv.	19 0 190	caudatum, Engl	•••	Vi.	
	•••	77	192	commutatum, Schott	••	,,	502
elliptica, Chois	•••	"	185	concinnum, Schott	•••	"	505
	•••	"		consanguineum, Schott	•••	"	505
	•••	17	191	cornutum, Schott	•••	>7	506
	•••	27	196	costatum, Mart	•••	"	501
27 1 1 1 - 1 - 1 1	•••	"	189	costatum, Wall	•••	"	500
	•••	"	185	curvatum, Kunth	•••	"	502
	•••	"	187	cuspidatum, Engl	•••	"	497
	•••	"	186	decipiens, Schott	•••	"	508
	•••	"	190	dolosum, Schott	•••	"	500
	•••	"	188	echinatum, Schott	•••	"	506
	•••	"	188	eminens, Schott	•••	"	500
	•••	"	189	erubescens, Schott	•••	,,	506
	•••	"	189	? erubescens, Dalz. & Gi	DB.	"	504
	•••	"	186	exile, Schott	•••	"	506
	•••	"	186	filicaudatum, N. E. Br.	•••	**	507
ornata, Sweet	• • •	"	183	filiforme, Thw	•••	"	50 4
osyrensis, Chois	•••	"	192	timbriatum, Mast	•••	"	502
pilosa, Arn	• • •	,,	189	flavum, Schott	•••	"	503
pomacea, Chois	•••	,,	188	fraternum, Schott	•••	,,	507
populifolia, Chois		,,	187	galeatum, N. E. Br.		"	502
populifolia, Chois	•••	,,	186	? gracile, Kunth	•••	"	512
Dankan ali iz Obazi		"	185	Griffithii, Schott		"	499
Dankan I !! Obala		,,	195	helleborifolium, Schott	•••	,,	502
		"	195	? heptaphyllum, Bl	•••	,,	508
	•••	"	188	Hookeri, Schott	4.	"	499
4 (NI2	•••	"	194	Hookerianum, Schott		"	499
	•••	"	185	Huegelii, Schott		"	504
	•••	"	186	intermedium, Bl		"	500
A23' 0.3' TET! LA	•••	"	184	Jacquemontii, Bl	•••	"	50 5
4. ((1) -1-			192	Jacquemontii, Engl			507
	•••	"	184	Kunstleri, Ilk. f	• • • •	"	497
(1)		"	185	Leschenaultii, Bl			504
117 111 1 1 777 ·	•••		187	Leschenaultii, Engl.		"	507
		187.	196	mirabile, Schott	•••	"	500
			185,	Murrayi, Hk		"	507
187, 189, 190, 19	 19 1	194	195	neglectum, Schott	•••	"	504
Argyrolobium, Eckl. & Zer			63	nepenthoides, Mart		"	504
7 4 6			63	ochraceum, Schott		"	507
0 · 1 · 1 · 1 · 0 · 0	•••	"	63	papillosum, Steud	•••	"	504
	•••	"	64	? pentaphyllum, Schott	•••	"	508
ornithopodioides, J. & S.	•••	"	64	petiolulatum, Hk. f	•••	"	498
		"	64	Prazeri, Hk. f		"	501
4	•••	'n	375	propinquum, Schott	•••	"	501
	•••		375	pulchrum, N. E. Br.	•••	"	505
	•••	"	252	? pumilum, Bl	•••	"	509
	•••	vi.	490		•••	"	497
		vi.	519	Rozburghii, Kunth	٠	"	503
			519	Scortechini, Hk. f	·	"	500
pettata, Numo	•••	"	519	speciosum, Mart	•••	"	502
·	•••	"		Steudelii, Schott	•••	"	500
		Vì.	497 509	Stracheyanum, Schott	•••	"	502
	•••	"	508 505	tortuosum, Schott	•••	"	
	•••	"	505	utile, Hk. f	•••	19	499
	•••	"	498	verrucosum, Schott	•••	"	499
	•••	**	505	vituperatum, Schott	•••	"	506
anomalum, Hemsl	•••	"	498	Wallichianum, Hk . f .	•••	"	500

			A		
Arisema	Vol.		Aristida	Vol.	
Wattii, Hk. f	₹l.	498	mallica, Edgew	. V 11.	226
Wightii, Schott	"	507	meccana, Trin. & Rupr	. 11	226
Wightii, Hook	"	504	modatica, Stoud	. ,,	224
Wightii, Hook Wrayi, Hemsl	,,	503	montana, Bottl	. 11	242
sp., Wall vi.	498,	502,	murina, Aitch		226
504, 505,	, 506,	510	mutabilis, Trin. & Rupr	. ,,	226
Arisarum amboinense, Rumph	₹i.	510	mutabilis, Trin. & Rupr	. ,,	225
Ariseia (vide Aniseia) Afzelii,			nutans, Willd		225
G. Don	iv,	217	paniculata, Forsk	. ,,	225
bracteata, Hasak	12	217	paradisea, Edgew		228
Aristaria barbata, Jungh		211	paradoxa, Schmidt		226
mutica, Hassk	,,	217	pilosa, Heyne		226
Aristega lævifolia, Miers	í.	101	plumosa, Linn		228
		223	pogonoptila, Boiss		228
Aristida, Linn abyssinica, Trip. & Rupr.	"	224	pumila, Done		225
Adscenscionis, Linn	"	224	pusilla, Trin. & Rupr		225
Adscenscionis, Trim.	"		quinqueseta, Steud	•	225
/ . J J		225	Raddiana, Savi		228
ethiopica, Trin. & Rupr	"	225	redacta, Stapf		227
17 17 17 1	"	226			228
	"	225	minocomo D Pa O		228
arundinacea, Roem	"	242	Royleana, Trin. & Rupr. vi		
arundinacea, Wall	"	228	Schimperi, Hochst. & Steud		
brachypoda, Tausch	"	224	0.1		226
cærulescens, Desf	"			• "	225
canariensis, Willd	"	224	setacea, Retz		225
capillacea, Cav	"	224	setacea, Trip		224
chætophylla, Steud	"	224	simplicissima, Steud	. ,,	
ciliata, Steud. & Hochst.	"	228	spicata, Rottl		226
cœrulescens, Thw	"	225	spicigera, Trin. & Rupr		225
Cumingiana, Trin. & Rupr.	"	224	stipacea, Ehrenb. & Hempr	• ,,	227
curvata, Nees	"	224	tenella, Kurs	• ,,	224
cyanantha, Steud	"	225	Teneriffæ, Stend	. ,,	224
decorata, Steud	"	228	tenuis, Hochst	. ,,	226
delicatula, Hochst	. "	224	trichodes, Walp	77	224
depressa, Retz vii.	2z4,	227	tripilis, Thunb	. 17	226
divaricata, Jacq	vii.		vulgaris, Trin. & Rupr	. ,,	225
Ehrenbergii, Trin. & Rupr.	"	225	<i>sp.</i> , Wall vii	. 22 5,	227
elatior, Cav	"	224	Aristolochia, Linn	. v .	74
festucoides, Hochst	99	224	abyssinica, Klotz	٠,,	75
festucoides, Poir	"	225	acuminata, Duchart	,,	76
Forskahlii, Tausch	"	228	acuminata, Roxb		75
funicularis, Trin	,,	226	atropurpurea, Parish		76
funiculate, Trin. & Rupr.	"	226	bracteata, Retz		75
funiculata, Boiss	"	227	bracteolata, Lamk	• • •	75
gigantea, Linn. f	"	225	Cathcartii, Hk. f	• • • • • • • • • • • • • • • • • • • •	77
Heymannii, Rogel	"	225	Griffithii, Hk. f. & T		77
hirtigluma, Steud	"	227	indica, Linn	•••	75
hystricula, Edgew		227	Kotschyi, Hochst	••	75
	"	225	lanceolata, Wight	•••	75
77	"	225	mauritiana, Pers	••	75
77 4 1 10	"	225		••	75
4	"	225	1777		75
	"	226	mandamata Wall	••	75
Kotschyi, Hochst	"	226			76
Kunthiana, Trin. & Rupr.	"	228	platanifolia, Duchart		76 75
lanata, Forsk	"	800	Roxburghiana, Klotz		76
linearifolia, Rottl	"		saccata, Wall		
macrathera, A. Rioh	"	226	Thwaitesii, Hook	• 11	77

Aristolochia		Page	Artemisia		. Page
trilobata, Linn		600	fætida, Jacq	111	. 822
sp., Griff	▼. 7	D, 77	fragrans, Willd	*** 71	
sp., Wall	▼•	78	glabrata, DC	,,	822
ARISTOLOCHIACEA	₹.		glauca, Pall	,,	822
Arnebia, Forsk		175	Gmelini, Bess	.:: -2	830
echioides, Hook	27 .	176	grata, Wall		5, 326
	iv. 176,		Griffithiana, Boiss	ii	
hispidissima, DC	ìv.	176	Halimodendron, Ledeb.	,,	821
perennis, A. DC	*** "	177	hemisphærica, Roxb	,1	
Thomsoni, Clarke	,,	176	hireuta, Rottl	,,	246
tibetana, Kurs	••• ,,	176	hypoleuca, Edgew	31	826
tingens, A. DC	,,	177	hypoleuca?, Hk. f. & T.	,	
sp., Hk. f. & T.	,;	176	indica, Willd	1	325
Arnica nivea, Wall	iii.	890	Jacquemontiana, Bess.	••• ,	
piloselloides, Linn		390	kohatica, Klatt	,,	
Aroid, Wall vi. 495, 5			laciniata, Willd	••• 99	
5 2 1, 52 2 , 52 3 , 524, 52	5, 529,	530,	lavandulæfolia, DC	••• ••	325
533, 534, 536, 537.			Lehmaniana, Bunge.	,	
Aroidez	vi.	490	leptophylla, D. Don	,	
Arrhynchium labrosum, Li		28	leptostachya, DC	••• ,;	
Arsis rugosa, Lour	i.	893	macrocephala, Jacq.	9	829
Artabotrys, Br	i.	53	maderaspatana, Roxb.	•••)	247
burmanious, A. DC.	;;	55	maritima, Linn	,	, 828
caudatus, Wall	•••))	55	Messerschmidiana, Bess	L,	827
crassifolius, Hk. f. & T	···· ,,	54	minima, Linn	,	917
hamatus, Bl	,,	54	minor, Jaca	, ,	990
Kurzii, Hk. f. & T	,,	54	mollissims, D. Don	,	990
maingayi, Hk. j. & T.	,,	55	Moorcroftiana, Wall.	,	997
malayanus, Griff	*** ;;	83	myriantha, Wall	••• ,	QQE
odoratissimus, Br	,,	54	nilotica, Linn	,	014
pleurocarpus, Maing.	,,	54	nubigena, Wall	,	- 910
speciosus, Kurs	,,	55	nutans, Willd	,	824
suaveolens, Bl	,,	55	pallens, Wall	,	200
zeylanicus, Hk. f. & T.	;;	54	pallida, Salisb	,	829
Artanema, D. Don	iv.	274	paniculata, Roxb	,	99K
angustifolium, Benth.	***))	275	parviflora, Rosb	,	999
sesamoides, Benth	,,	274	parviflora, Wight	,	225
Artemisia, Linn	iii.	82 1	persica, Boiss	••• ;	99/7
Absinthii, Heyne	••• 33	329	pontica, Linn	,	990
Absinthium, Linn	*** 77	328	purpurascens, Jacq	,,	000
acetica, Jacq	,,	824	revoluta, Edgew	••• 3	292
affinis, Hassk	***);	325	riparia, Hem	*** 91	90Æ
amygdalina, Done	,,	325	Roxburghiana, Bess.	*** 7	994
annua, Linn	•••))	328	Royleans, DC	,	400.
anomala, Hance	*** 77	325 .	sacrorum, Ledeb	,	298
biennie, Willd	,,	824	salsoloides, Willd	1	291
brevifolia, Wall	,,	824	scoparia, Waldst. & Ki	t ,,	. 606
Campbellii, Hk. f. & T.		327	Siversiana, Willd	•••)	990
caruifolia, Ham	,,	824	sternutatoria, Roxb	••• ,	01/7
cunsifolia, DC	,,	322	Stewartii, Clarke	· • • • •	900
desertorum, Spreng	,,	822	Stracheyi, Hk. f. & T.		999
Dracunculus, Linn	,,	321	stricta, Edgew	7	999
dubia, Wall.?	,,	822	l tenuisora. Jacq	9	910
dubia, Wall		825	tibetica, Hk. f. & T	••• 7	990
elegans, Boxb		323	Tournefortians, Rchb.	••• 7	004
Falconeri, Clarks	• • • • • • • • • • • • • • • • • • • •	828	trichophylla, Wall		909
fasciculata, Hk. f. & T.	••• ,,	318	vostita, Wall		000
justiciality ass. I. G I.	,,	~~~	1 4-2000000000000000000000000000000000000	,	,

Artemisia	Vol	Page	Arthrophyllum	Val	Page
vulgaris, Linn		325	ovalifolium, Jungh	• •	734
Wadei, Edgew		328	pinnatum, Clarke		734
Wallichiana, Bess		326	pinnatum, Maingay	••	734
Arthratherum ciliatum, Neos		228	Arthrosprion stipulatum,	• "	
-1-4 10 -1		228	37	ii.	300
7 1 1 1 T P O		228	? Arthrostachysgracilis, Desv		210
77 () 77)		227	Arthrostemma paniculatum		
1 ' 37		228	D. Don	. ii.	525
		228	Arthrostylis chinensis, Benth		651
		228			650
TO 1 13.1		227	filiformis, Thw		478
		228	ARTOCAHPEE Artocarpus, Forst		539
Schimperi, Nees	";	7 40			540
Arthraxon, Beauv	V11.	144	bracteatus, King		540
breviaristatus, Hack	"	145	Charlesha Rock	• • • • • • • • • • • • • • • • • • • •	543
ciliaris, Beauv	"	146	Chaplasha, Rozb		540
ciliaris, Beauv	"	145	cuspidata, Griff		542
ciliaris, Hack	"		Dadah, Miq		
coloratus, Hochst	"	146	Denisoniana, King		544
cuspidatus, Hochst	"	146	echinata. Roxb	"	540
echinatus, Hochst	"	143	elongatus, Miq	. ,,	493
gracilis, Hoohst	"	146	Forbesii, King		539
inermis, Hk. f	,,	145	Gomeziana, Wall	. ,,	544
japonicus, Miq	"	146	hirsuta, Lamk	• ,,	541
jubatus, Hack	"	147	incisa, Linn, f	• ,,	539
Janceolatus, Hochst	"	143	integrifolia, Linn. J	. ,,	541
lanceolatus, Hochst	"	146	Kunstleri, King	, ,,	540
lancifolius, Hochst	"	147	Lakoocha, Rovb	, ,,	543
Langsdorfianus, Hochst	"	146	lanceæfolia, Roxb	,,,	543
lasiocoleos, Hochst	"	146	lanceæfolia, Rozb	. 1.	309
major, Hochst	,,	146	Lowii, King	, ,,	542
micans, Hochst	1)	146	Maingayi, King	,,,	542
microphyllus, Hochst	,,	147	mollis, Wall	. ,,	543
microphyllus, Hochst	"	147	nobilis, Thw	. ,,	542
minor, Hochst	,,	147	peduncularis, Kurz	,,,	541
nudus, Benth	,,	146	Polyphema, Pers	. ,,	542
nudus, Hochst	,,	146	pomiformis, Teyem. & Binn	. ,,	544
rudis, Hochst	,,	144	pubescens, Willd	, ,,	541
Schimperi, Hochst,	,,	146	pubescens, Moon	, ,,	543
Schmidtii, Hochst	,,	146	rigida, Bl	,,,	540
serrulatus, Hoohst	,,	143	rigida, Wall	,,,	544
spathaceus, IIk. f	,,	145	rufescens, Kurz	,,,	540
submuticus, Hochst	,,	144	Scortechinii, King		542
submuticus, Hack	"	145	Tampang, Miq		540
violaceus, Hochst	**	146	tephrophylla, Miq		544
sp. Wall vii. 117, 144,	145,	146	Arum, Linn	vi.	509
Arthrochemum, Moq	٧.	11	angulatum, Griff		512
fruticosum, Moq	,,	12	bulbiferum, Roxb		515
? glaucum, Ung	,,	12	campanulatum, Koxb		513
indicum, Moq	"	12	clavatum, Dest		508
indicum, Thw	"	12	Colocasia, Linn		523
Arthromischus armatus, Thw.		511		. 5ŰO,	501
Arthrophyllum, Bl	ii.	733	crenatum, Wight	•	512
alternifolium, Maingay	,,	734	cucullatum, Lour		525
Blumeanum, Zoll. & Mor.	"	734	curvatum, Roxb		502
	727,		cuspidatum, Bl	•••	512
ellipticum, Bl	ii.	734	cuspidatum, Roxb	•••	497
javanicum, Bl	"	734	divaricatum, Linr		510
g, 2011 111 111 111	"			- 11	

Arum		۷ol.	Page	Arundinaria		Vol.	Page
divaricatum, Thw			513	aristata, Gamble			382
echinatum, Wall	•••	,,	506	armata, Gamble		,,	385
erubescens, Wall		"	506	callosa, Munro			380
flagelliforme, Lodd	•••	"	512	callosa, Munro	• • • •	,,	385
flavum, Forsk	•••	"	503	debilis, Thw		"	378
fornicatum, Roxb		"	526	densifolia, Munro		"	379
gracile, Roxb		"	512	alamana V		"	378
grandiflorum, Ham		"	518	falcata, Nees	•••	"	381
Griffithii, Schott	•••		509	10 - 1		"	383
guttatum, Wall		"	508	floribunds, Thw	•••	"	377
indicum, Roxb	•••	"	525	1 (7-33-43 t iv 13	•••	"	384
integrifolium, Link		"	529	Gammieana, Gamble	•••	**	379
Jacquemontii, Bl	•••	"	509	glaucescens, Beauv	• • • •	"	391
1	•••	"	517	Griffithiana, Munro	•••	"	379
macrorrhizon, Linn	•••	"	526		•••	,,	384
margaritifer, Roxb	•••	"	519	hiranta, Munro	•••	"	877
	•••	"	513	hispida, Steud	•••	"	382
	•••	"		Hookeriana, Munro	•••	"	
montanum, Roxb	• • •	"	525	intermedia, Munro	•••	"	381
mucronatum, Spreng.	•••	"	513	jaunsarensis, Gamble	•••	"	384
Murrayi, Grah	•••	"	507	kbasiana, Munro	•••	"	381
nepenthoides, Wall	•••	"	504	Kurzii, Gamble	• • •	**	385
nymphæifolium, Rozb.	•••	"	523	Mannii, Gamble	•••	"	385
occultatum, Ham	• • •	"	515	microphylla, Munro	• • •	,,	383
odorum, Roxb	• • •	,,	526	moliniformis, Hoohst.		,,	377
orivense, Roxb	• • •	"	509	Pantlingi, Gamble		"	380
ovatum, Linn	•••	"	495	polystachya, Kurz	,	,,	378
pedatum, Willd	• • •	"	<i>5</i> 08	Prainii, Gamble		,,	383
peltatum, Lam	•••	"	528	procera, Wall		"	382
pentaphyllum, Linn	•••	"	508	racemosa, Munro		"	879
peregrinum, Linn		"	526	Rolloans, Gamble		"	384
P pumilum, Lamk		"	509	spathiflora, Trin	•••	"	382
Rumphii, Gaud	•••	"	514	suberecta, Munro	•••	"	885
sessiliflorum, Roxb	•••	"	508	Putilis, Clegh		"	381
speciosum, Wall	•••	"	500	Walkerians, Munro	•••	"	377
spirale, Grah		"	494	Wightians, Nees		"	377
spirale, Retz			404	sp., Lisboa			70
sylvaticum, Roxb		"	518	Arundinella, Raddi		vii.	68
Accest Jon TY-		"	515				71
4 . 4		"	502		•••	"	69
trilobatum, Bot. Mag.		"	510		•••	"	73
A/7-1-A	•••	"	509	birmanica, Hk . f blephariphylla, $Trim$.	•••	"	77
4	•••	"	510	brasiliensis, Raddi	•••	"	73
T J., 31	•••	"	608	Campbelliana, Lisbon	•••	"	69
	•••	"	522		•••	"	74
viviparum, Roxb	•••	"	520	capillaris, Hk. f	•••	".	
sp., Griff	•••	"	856	ciliata, Nees	•••	"	71 75
Arundina, Bl	•••	▼.		Clarkei, Hk. f	•••	"	
affinis, Griff	•••	"	857	Ecklonii, Nees	•••	"	73
bambusifolia, Lindl.		".	857	fuscata, Nees	٠	"	74
Cantleyi, Hk. f	ರಾರ,		195	gigantes, Dalz	•••	"	76
chinensis, Bl	37	v.	857	hirsuta, Nees	•••	"	70
densa (densifiora), Lin	aı.	"	857	holcoides, Trin	•••	"	71
minor, Lindl	•••	"	867	Hookeriana, W. & A.	•••	"	264
revoluta, $\underline{H}k.f$	•••	"	858	Hookerii, Munro	•••	"	73
? speciosa, Bl	٠	"	857	indica, Trin	•••	"	77
Wallichii, Rchb. f	•••	"	858	japonica, Duthie	•••	"	77
Arundinacea, Griff			805	khaseana, Nees	•••	99	71
Arundinaria, Michx	•••	₹1i.	37 6	Lawsoni, Hk . f	•••	"	76

Arundinella	v	a	Page	Arundo		Vol.	Page
laziflora, Hk. f	1	rii.	Page 75	tibialis, Roxb		vii.	
leptochlos, Hk. f		"	76	triflora, Roxb		,,	808
martinicensis, Trip	•••	"	73	vulgaris, Lamk		"	804
mesophylla, Nees	•••	"	69	Zollingeri, Buese		••	305
Metzii, Hochst		"	72	sp., Wall vii. 8	303,	804,	805
Mikani, Nees	•••	ή,	73	Arytera? macrocarpa, Mi		i.	52 8
mutica, Nees	•••	"	74	Asarum, Linn	•	₹.	72
nepalensis, Trin		"	78	himalaionm, Hk. f. &	T.	**	72
nervoss, Nees	vii.	70	, 242	Ascaricida indica, Cass.		iii.	237
nervosa, Duthie			70	Ascarina serrata, Bl		v.	100
nervosa, Thw	•••	"	75	ASCLEPIADEÆ	•••	iv.	ı
pallida, Nees		"	73	Asclepias, Linn	•••	iv.	18
pilosa, Hochst	•••	"	71	acida, Roxb	•••	"	26
pumila, Stend		"	71	acuminata, Roxb	•••	,,	30
purpurea, Hochst	•••	"	74	annularis, Roxb	•••	,,	21
pygmes, Hk. f		"	72	aphylla, Roxb		"	26
rigida, Nees		"	73	asthmatica, Willd	•••	"	45
Ritchiei, Munro			73	curassavica, Linn		"	18
Schultzii, Benth		"	64	dichotoma, Rottl		"	42
setifera, Stoud		"	70	echinata, Herb. Madr.	•••		85
setosa, Trin		"	70	echinata, Boxb			20
spicata, Dalz			77	geminata, Roxb		"	29
stricta, Nees	•••	"	70,78	gigantea, Willd			17
tenella, Nees			71	herbacea, Roxb	•••	"	18
Thwaitesii, Hk. f		"	77	lactifera, Linn			81
tuberculata, Munro	•••	"	69	laurifolia, Roxb	•••		16
villosa, Arn		"	72	longistigma, Roxb		"	14
937 - 117 - 1 77 - 37	•••	"	75	1 11 12 13	•••		20
P sp., Wall. vii. 69, 70,	71 79	"7	• -	0 7 70	•••	• • • • • • • • • • • • • • • • • • • •	32
4	11,14	,, , -::	302	odoratissima, Roxb	•••	"	38
Dl., 71			395	, ,, , , , , , , , , , , , , , , , , ,	•••	"	38
bambusifolia, Griff	•••	"	303		•••		57
, , , ,	•••	"	303	1 , , , ,	•••	**	61
1.74 miles Thinks	•••	"	303	l D. D. D	•••		18
A !A	•••	"	221	Pseudo-sarsa, Roxb	·	"	5
T) 1	•••	"	804				19
Daman Time	•••	"	30 2	pulchella, Roxb	•••	ì	46
Donax, Linn	•••	"	804	racemosa, Roxb	•••	` >>	17
Donax, Ham	•••	"	260	rosea, Roxb spiralis, Forsk	•••		20
Epigejos, Linn	•••	"		1 ~ 1 % 1	•••	"	59
glauca, M. Bieb	•••	"	261 304	Sussuela, Roxb	•••		35
graeca, Link	•••	"		tenacissima, Roxb	•••	"	41
Karka, Rets	•••	"	304 261	tenuis, Heyne	•••		42
lawa, R. & S	•••	"	261 ·	tenuissima, Roxb	•••	**	84
littorea, Schrad	•••	"	303	tinctoria, Roxb	•••		81
longifolia, Salish	٠	"		tingens, Roxb	•••	• • • • • • • • • • • • • • • • • • • •	85
madagascariensis, Kunt		"	80 5 80 3	tomentosa, Herb. Madr		•••	63
mauritanica, Poir	•••	"	304	tuberosa, Roxb	•••	•••	45
maxima, Forsk	•••	"		tunicata, Hort. Cale.	•••		23
montana, Ham	•••	"	61 304	tunicata, Roxb	•••		23 22
Phragmitis, Linn	• • •	"		Vincetoxicum, Linn	•••	"	63
Pliniana, Griseb		,,	303 305	volubilis, Herb. Madr.	•••		46
Reynaudiana, Kunth	•••	,,		volubilis, Linn. f	•••	**	45
Rowhurghiana, Kunth	•••	"	30±	vomitoria, Koen	٠		668
Roxburghii, Kunth	•••	,,	804	Ascolepis kyllingioides, St			663
sativa, Lamk		,,	303 266	tenuior, Steud	•••		252
sylvatica, Sohrad	•••	"		Ascyrum, Linn	•••	ì.	252
P tecta, Blanc	•••	"	804	filicaule, Dyer	•••	97	808

Vol. Page	Asphodelus	.Vol	. Page
Asiphonia piperiformis, Griff. v. 78		vi	
Aspalathus cuneata, D. Don. ii. 142	persicus, J. & S	,,	333
indica, Linn " 94		,,	382
ASPARAGEA vi. 800		¥1	
Asparagopsis abyssinica,		,,	826
Kunth vi. 816		,,	826
acerosa, Kunth ,, 317		,,	323
adscendens, Kunth ,, 818		Vi	
Brownei, Kunth vi. 316, 317		Vii	
Curilla, Kunth vi. 318	Duthiei, Stapf	,,	375
Decaisnei, Kunth , 316	Hystrix, Willd sibirica, Trautv	,,	875
floribunda, Kunth ,, 316	sibirica, Trautv	,,,	875
Hohenackeri, Kunth " 316		i▼	
javanica, Miq ,, 317		!!	167
rubricaulis, Kunth ,, 319		111	
sarmentosa, Dalz. & Gibs. " 317		,,	209
Asparagus, Linn vi. 314		,,	205
acerosus, Rosb ,, 317		,,	209
acerosus, Wall ,, 316		,,	205
adscendens, Roxb ,, 317		,,	205
aethiopicus, Linn " 318		::	205
asiaticus, Linn ,, 316	Asphota, Jones	iji	
asiaticus, Wight ,, 316		i.	
capitatus, Baker ,, 315		;	95 419
Curillus, Ham 318	Aspidop erys, Juss	1.	
Curillus, Wall vi. 315, 316, 318	canarensie, Dalz	1. 420	0, 697
dubius, Done vi. 316			0, 422
dumosus, Baker ,, 315		i	
falcatus, Linn ,, 318	· · · · · · · · · · · · · · · · · · ·	,,	420
fasciculatus, Br vi. 316, 317		,,	420
filicinus, Ham vi. 314		,,	421
foribundus, Rottl ,, 315		,,	421 421
gonoclados, Baker ,, 318	1 '- '	,,	421
gracilis, Royle ,, 315		,,	420
Jacquemontii, Baker , 316		,,	491
lævissimus, Steud " 317		,,	420
lycopodineus, Wall ,, 315		,,	401
200002010, 20000 111 111 11 916		,,	490
015	and the same and t	,,	401
	17.10.	,,	400
	1 4 - 12 - 1	vi	
00; menocado, 220, 20		iii	
,	77		OKM
-L-1 04 915		,,	OEA
	1 2		051
		ii. 24	
	1	iii	
	117-11		959
Asphodelopsis arangadinensis,	37444		OEG
		,,	OFO
	1 12:10:11 17		050
	1		950
1	1 .1 7' V2 31		957
000000000000000000000000000000000000000	diplostophioider, Benth.	11	951
Catalogue Time		• • • • • • • • • • • • • • • • • • • •	950
n-LL 999		•••	017
microcarpus, Robb ,, 352	1 10.1 mlaurone) mapau	,,	

Aster	V	ol. I	Page	Astragalus	,	Val.	Page
· · · · · · · · · · · · · · · · · · ·	ii		250	cicerifolius, Royle		ii.	134
1.2		,,	250	ciliolatus, Benth		"	129
L. J 1		"	299	coluteocarpus, Boiss.		"	180
7. 37 TT		,,	299	concretus, Benth		"	181
	-	"	249	confertus, Benth			123
200 - 200 -		"	256	contortuplicatus, Linn.		"	122
7 '. 707/11.3		"	253	crassicaulis, Grah		"	117
T 1 ' 67 1		"	253	Daltonianus, Bunge		"	134
		"	343	densifiorus, Kar. & Kir.		"	125
		" "	251	distans, Benth		"	128
		"	256	Donianus, DC	•••	"	119
'4' 1 1 TAO		"	253	Emodi, Steud		"	180
		"	343	erpocaulos, Boiss		"	122
7 . 7 . 377.33		"	252	Falconeri, Bunge		"	120
To 1 11 777 A		"	249			"	127
7 . 7 . 773 . 8 . 6 . 60		"	252	floridus, Benth frigidus, Bunge	•••	"	130
9		"	251	Gerardianus, Grah	,	"	116
sikkimensis, Hk. f. & T.			252	glabrifolius, Bunge	•••	"	136
		"	251	Govanianus, Grah		"	128
A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			250	gracilipes, Benth	•••	"	122
m		,,	252	Grahamianus, Royle	•••	"	134
A32 - A2 TTT - C		"	251	graveolens, Ham	•••	"	131
		"	250	l Y 🛂 .	•••	"	122
A-1		"	252		•••	"	120
Asteracantha auriculata, Ne		"	409	Hendersoni, Baker	•••	••	118
1			409	Heydei, Baker	• • • •	"	126
	ii, 2	"		himalayanus, Klotz	•••	"	128
				himalensis, Jacquem.	•••	"	119
	1	ii.	389	hippocrepidis, Benth.	•••	,,	123
			389	hosackioides, Benth.	•••	"	
		"	389	humifusus, Jacquem.	• • •	"	119 124
japonica, Morr. & Dene.		"	389	hypoglottoides, Baker	•••	"	
		"	389	inconspicuus, Baker	• • •	"	126 · 134
rubre, Hk. f. & T		"	389	Jacquemontii, Bunge	•••	"	180
Ciantina in Trans		"	389	khasianus, Benth	•••	"	
Man 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		"	389	kongrensis, Benth	• • •	"	120 135
	_	"	118	lasiocladus, Benth	•••	"	====
		١.	132	leptacanthus, Benth	•••	"	135
		"	120	leptocentrus, Bunge	•••	"	135
		"	121	lessertioides, Benth.	•••	"	124
		"	121	leucocephalus, Grah.	•••	"	128
		"		longicaulis, Baker	•••	"	129
		» ·	123 119	longipes, Kar. & Kir.	•••	19	128
		"	122	macropterus, DC	•••	"	128
ammocryptos, Boiss.		"	136	macrorhizus, D. Don	•••	"	119
		"	138	Maddenianus, Benth.	٠٠٠;	"	127
		"	121	malacophyllus, Benth.	•••	"	138
		"		Mazwellii, Royle	•••	"	124
11 4		"	132 126	medullaris, Buiss	•••	"	131
		"		melanostachys, Benth.	•••	"	125
		"	135	microphyllus, Jacquem.		"	134
		"	195	minutus, Boiss	•••	"	122
	•••	,	125	mirpourensis, Cambers.	• • •	"	118
		"	187	Moorcroftianus, Wall.	•••	"	249
2 2 70 43		"	132	multiceps, Wall	•••	"	134
		"	126	Munroi, Benth	•••	"	128
		"	127	mutabilis, Jacquem	•••	"	125
chlorostachys, Lindl	••• 1	,,	128	nivalis, Kar. & Kir	•••	"	136

Astragalus	v	ol.	Page	Asystasia	Vol.	Page
1?		ii.	117		iv.	493
ophiocarpus, Benth		,,	122	coromandeliana, Bot. Mag.	"	494
		,,	134	coromandeliana, Wight	"	494
D-1		"	125	crispata, Benth	,,	494
mandaman landa 10 da		,,	136	denticulata, Nees	"	465
J		"	180	gangetica, T. Anders		493
11 71 - 7		,,	134	intrusa, Bl		493
7		,,	116	? Kunthiana, Nees	"	496
		,,	121	lanceolata, T. Anders	"	495
psilocentrus, Fisch		"	134	Lawiana, Dalz	,,	496
. 1 . 1 TZ 1 TZ		"	128	macrocarpa, Nees	"	495
		,,	119	mysurensis, T. Anders	,,	496
manual adapt to a D		,,	188	Neesiana, Nees	"	496
rhizanthus, Royle	•••	,,	131	nemorum, Nees iv.	493	, 494
mindalulma Daudi		"	128	Panichanga, Nees	iv.	473
		"	131	Parishii, T. Anders	į,	499
D 1		"	132	pauciflora, Nees		501
namilania Hamah		"	134	plumbaginea, Nees		493
D		"	119	thyrsacanthus, T. Anders.		497
0	• • •	"	131	travancorica, Bedd	,,	494
	•••	"	121	violaces, Dals	,,	494
-11-1-1		"	126	violacea, Hk. f	,,	493
O4		"	129	sp., Hk. f. & T iv.	495,	496
-4!		"	131	Atacca cristata. Kunth		287
		"	131	integrifolia, Presl	,,	288
-4.0-4m - A1	•••	"	124	Atalantia, Corr	i.	511
-4 1.11! d 10 1		"	135		508	514
, , , , , ,		"	133	buzifolia, Oliv		508
			136	capitellata, Lindl	,,	512
	•••	77	119	carissoides, Wall	"	512
		"	126	caudata, Hk. f	39	513
Assessment and Description			134	ceylanica, Oliv	"	512
/P/1		"	136	floribunda, Wight	,,	512
42h - 4 Th 41	•••	"	124	missionis, Oliv	"	513
	•••	"	120	monophylla, Corr	"	511
4	•••	77	122	platystigma, Wight	"	512
4-2-1		"	121	racemosa, W. & A	,,	512
T		"	138	Roxburghii, Hk. f	•,	513
			131	Rosburghii, Oliv	,,	518
		"	128	Ataxia Hookeri, Griseb	vii.	223
1007 - 1. b. 1		"	132	Ate acuminata, Thw	vi,	133
		"	129	virens, Lindl		133
		"	134	Atelanthera, Hk. f. & T	i.	188
A. L		i.	598	perpusilla, Hk. f. & T		138
4 4 537 14		i.	629	Athamantha achilleifolia,	"	
A -A 2 D1		ii.	550	Wall	iî.	684
11 (4.11 (7)			550	Ajowan, Wall	"	682
•		" ii.	513	anethifolia, Wall	"	683
Astronium insigne, Marchai		ii.	30	depressa, D. Don		701
Astropetalum sp., Griff	·~ ;;		, 27	diffusa, Wall	,,	698
			339		"	720
		iv.	492	m 1 1 1 11 11	"	682
·			495		79	720
A1 ' 37'		"	493	Athanasia indica, Roxb		377
		"	469	Atherandra, Done		9
3 3 37		"	493	soutifolis, Dene		9
		"	494		,,,	. 9
chelonoides, Nees	•••	"		cuspiaata, Bl	,,,	_

Atherandra	•	Val	Dama	Atylo sia Vol.	Page
		vol. iv.	Page 9	mollis, Benth ii.	218
Wallichii, Benth	•••		8	nives, Benth ,,	214
Atherolepis, Hk . f	•••	iv.	8	platycarpa, Benth ,,	216
Wallichii, Hk. f	··i	v. 8.	788	punctata, Dalz "	218
Atherostemon, Bl		i⊽.	8	rostrata, Baker ,,	216
javensis, $Bl.$	• • • • • • • • • • • • • • • • • • • •	•,	8	rugosa, W. & A "	215
Athroisma, DC		iii.	276	scarabsoides, Benth ,,	215
laciniatum, DC		"	276	serices, Benth ,,	213
Athroisma, Griff		v.	396	subrhombea, Miq ,,	218
dentatum, Griff		"	896	villosa, Benth ,,	214
serratum, Griff	•••		896	Aubletia caseolaris, Geertn ii.	580
Atragene zeylanica, Linn.	•••	ï.	7	Aucklandia Costus, Falc iii.	876
Atraphacis sp., Aitch		V.	28	Aucuba, Thunb ii.	747
Atrategia, Bedd	•••	i.	74	himalaica, $Hk.f.$,,	747
Thomsoni, Bedd	•••	,,	75	japonica, Thunb "	747
Atriplex, Linn		Ÿ.	6	l longifolia, Hk	747
Belangeri, Boiss		"	7	Aulacodiscus, Hk. f iii	. 97
bengalensis, Lamk		"	6	premnoides, Hk. f ,,	97
crassifolia, C. A. Mey.	•••	2)	6	Aulacospermum simplew, Ost.	
cristata, Koen	•••	"	7		705
Griffithii, Moq		"	8	Aurantiacea, Wall i. 501	.502
heterantha, Wight	•••	"	6	AUBANTIEZ i.	484
hortensis, Linn	•••	"	6	Avena, Linn vi	. 274
Koenigii. Wall		"	7	senes, Hk . f ,,	279
laciniata, Aitoh	•••	"	7	airoides, Koel "	278
laciniata, Linn		"	7	alpina, Sm "	276
Lindleyi, Moq		"	8	argæa, Boiss ,,	276
repens, Roth	•••	"	7	aspera, Munro ,,	277
repens, Aitch	•••	"	7	aspera, Griseb "	277
roses, Linn	•••	"	7	athenanthera, Presl ,,	276
Stocksii, Boiss		"	7	barbatu, Brot ,,	275
tartarica, Linn	•••	"	7	benghalensis, Schwaegr "	280
virgata, Roth	•••	`,;	6	Besseri, Gmel ,,	277
ATRIPLICEE	•••	Ÿ.	1	bromoides, Mert. & Koch "	276
Atropa, Linn,	•••	iv.	241	byzantina, C. Koch ,,	275
acuminata, Royle	•••	"	241	caryophyllea, Weber,	272
Belladonna, Linn	•••	"	241	Cavanillesii, Koch ,,	276
Indeana Taba	•••	"	241	Clarkei, Hk. f ,,	278
physaloides, Linn	•••	"	240	fatua, Linn ,,	275
ATBOPEÆ	•••	iv.	228	flaceida, Hack ,,	280
Atropis distans, Griseb.		vii.	847	flavescens, Linn ,,	279
tenuiflora, Griseb	•••	"	847	hirsuta, Roth "	276
Atylosia, W. & A	•••	íí.	212	hirtula, Lag ,,	276
albicans, Benth		22	215	laeta, Salisb ,,	36 3
barbata, Baker		"	216	Loefflingiana, Cav "	276
candicans, Kurz		"	222	malabarica, Heyne "	69
Candollei, W. & A		"	212	micans, Hk. f ,,	279
eircinalis, Benth		"	219	mollis, Mich ,,	278
elongata, Benth		"	215	mysorensis, Spreng ",	287
geminiflora, Dalz		"	212	oligostachya, Munro "	283
glandulosa, Dalz	•••	"	218	orientalis, Schreb ,,	275
goensis, Dalz	•••	"	216	phleoides, Urv	278
grandiflora, Benth	•••	"	214	pilosa, Bieb vii. 275	, 280
kuinensis, <i>Dals</i> ,	•••	"	214	polyneura, Hk. f vii	
Lawii, Wight		"	218	pratensis, Linn ,,	276
lineata, W. & A	•••	"	218	pubescens, Royle ,,	277
major, W. & A		"	212	sativa, Linn ,,	275
•					

Avena	Vol	Page	Azima Vol.	Page
secunda, Jaoq	vii.	Page 276	sarmentosa, Benth iii.	Page 620
sempervirens, Boss	,,	277	tetracantha, Lamk ,,	620
sibirica, Linn	,,	231		
sikkimensis, Hk. f	,,	280	Babactes oblongifolia, DC iv.	859
sterilis, Del	,,	275	Baccaurea, Lour v.	867
sterilis, Royle	,,	275	acuminata, Muell ,,	376
subspicata, Clairv	,,	278	affinis, Muell "	369
toluccensis, H. B. K.	••• ,,	278	bracteata, Muell ,,	872
valesiaca, Nym	17	276	brevipes, Hk . f_{\bullet} ,,	872
virescens, Regel	,,	279	costulata, Muell "	878
sp., Wall		277	courtallensis, Muell ,,	367
AVENER	vii. 6,		dulcis, Jacq "	378
Averrhoa, Linn:	i.	439	flacoida, Muell "	870
Bilimbi, Linn	,,	489	Griffithii, Hk. f "	371
Carambola, Linn	,,	489 604	javanica, Muell ,,	376
Avicennia, Linn	iv.	604	lanceolata, Muell ,,	368 878
alba, Bl	,,	604	latifolia, King "	
intermedia, Griff	,,	604	macrocarpa, Muell ,,	375 369
officinalis, Linn	,,	604	macrophylla, Muell ,,	871
officinalis, Kurz	,,	604	macrostachya, Wight "	370
resinifera, Forsk	,,	604	Maingayi, Hk. f ,,	87 4
resinifera, Griff tomentosa, Jaoq	••• ,,	604	malayana, King ,,	370
	iv.	561	minor, Hk. f ,,	371
Avicennies Awanthes arborea, Bl	222	98	Motleyana, Muell ,, parviflora, Muell ,,	368
Plumagna Wight		99	malmaanna Ula f	869
Blumeana, Wight ceylanica, Wight elliptica, Wight	,,	98	polyneurs, Hk . f ,, propingua, Muell ,	371
ceylanica, Wight	,,	97	7611	378
	,,	97	meticulate Ul f	373
enneandra, Wight Griffithiana, Wight	••• ••	98		371
hirsuta, Wight	99	98	samida Rodd	368
a casa empara a c	,,	99	Contochinii Ul f	368
strigosa, Bl	,,	99	Dawmplosoides Ul f	376
? Avenfeldia intermedia			TOTALIS DIL F	375
Baill	' ∀ .	486	Wwawi King	374
Axinandra, Thwaites	ii.	581	l am A 1D	873
Beccariana, Baill	,,	581	sp., C. D ,,	874
Maingayi, Clarke	,,	581	sρ., E. F ,,	375
1 " 1 " m	,,	581	sp., G. H ,,	876
Axonopus, Beauv	vii.	63	Baccharis indica, Linn iii	
cimicinus, Beauv	,,	64	nitida, Wall "	268
corymbosus, Schult	*** 99	14	ovalis, Pers	272
semi-alatus, Hk. f	,,	64	trifurcata, Trev ,,	259
Aconotechium trianthemoid			Badamia Commersoni, Gertn. ii.	444 -
Fenzl	ii.	661	Bæckea, Linn ii.	463
Azyris, Linn	▼.	8	chinensis, Gærtn ,,	468
amaranthcides, Linn.	,,	8	Cumingeana, Schau ,,	463
ceratoides, Linn	,,	8	frutescens, Linn ,,	468
hybrida, Linn	,,	8	Bæobotrys acuminata, Spreng iii.	508
prostrata, Linn	*** ;;	9	acuminata, Wall. i. 619, iii.	508
Asadirachta indica, Juss.	<u>i</u> .	544	argentea, Wall iii.	
Azalea fragrans, Adams	iii.	472	dubia, Wall "	510
lapponica, Pall	,,	472	fragrans, Wall ,,	508
sp., Griff	,,	474	glabra, Roxb ,,	508
Azanza acuminata, Alef.	i.	845	indica, Roxb ,,	509
Lampas, Alef	!!	845	indica, Wall ,,	509
Asima, Lamk	iii.	620	macrophylla, Wall ,,	510

Bæobotroys	Val	Page			Val.	Page
? missionis, Wall		508	Balsamina chinensis, DC.		i.	444
mollis, Bl		510	coccinea, DC		,,	454
nemoralis, Roxb		509	cornuta, DC		"	454
ovata, Wall		508	fasciculata, DC		"	444
7 4 777-11		509	hortensis, DC			454
	-	508	latifolia, DC		,,	450
TO 1 1 10 0			Leschenaultii, DC		"	451
		663		•••	"	446
		663		•••	"	456
		522	oppositifolia, DC	•••	"	448
		522	rosmarinifolia, DC	•••	"	448
ægyptiaca, Wall	522		1 —	•••	'n	427
		237	Balsamodendron, Kunth.	•••	i.	529
Balanophora, Forst	₩.	237		•••		529
affinis, Gritf		287		•••	"	530
alveolata, Griff	•••	237	gileadense, DC	•••	"	529
Burmanniana, Griff		237 287	Mukul, Hook	•••	"	529
dinica, Br	"		pubescens, Stocks	•••	,,	529
elongata, Hk. f	"	238	Roxburghii, Arn	•••	"	529
elongata, Schott. & Endl.	٠,	237	Rozburghii, Stocks	•••	"	
gigantea, Wall		238	? Wightii, Arn	•••	?"	529
	257,		? zeylanicum, Kunth.	•••	1.	532
indica, Thw	₹.	238	Bambos stricta, Roxb	• • •	vii.	404
involucrata, Hk. f	79	237	Bambusa, Schreb	•••	₹ii.	386
picta, Griff	"	237	affinis, Munro	• • •	"	890
picta, Miq	"	238	Amahussana, Lindl	• • •	"	393
polyandra, Griff	"	288	andropogonifolia, Griff.	•••	"	412
Thwaitesii, Eichler v.	238,	862	aristata, Lodd		,,	397
typhina, Wall,	₹.	238	arundinacea, Willd.		,,	395
BALANOPHOREE	₹.	236	arundinacea, Ait		17	392
Balanopteris minor, Gertn	i.	863	Arundo, Klein		,,	395
Tothila, Gærtn	,,	363	atra, Lindl		"	3 93
Balanostreblus, Kurz	v.	ŏ44	attenuatu, Thw		,,	411
ilicitolia, Kurz	**	544	auriculata, Kurz		,,	396
Balansza Fontanesii, Boiss.			baccifera, Roxb	•••	"	417
& Reat	ii.	691	Balcooa, Roxb		"	391
Baldingera arundinacea,			bifolia, Sieb		"	386
Dumort	vii.	221	Binghami, Gamble		,,	392
colorata, Gærtn	"	221	P Bitung, Hassk		"	401
Baliospermum, Bl	₹.	461	Bitung, Schult		"	408
angulare, Dooe	,,	461	Blumeana, Schult. f.		,,	894
axiliare, Bl	"	461	Brandisii, Munro	•••	"	408
calycinum, Muell	"	462	burmanica, Gamble	•••	"	888
corymbiferum, Hk. f	.,	468	caesia, Sieb. & Znoc.	•••	"	890
indicum, Dene	",	461	calostachya, Kurz	•••	"	407
malayanum, Hk. f		463	capensis, Rupr	•••	"	391
micranthum, Muell	"	462				412
montanum, Muell	"	462	crinita, Thoms	··· 、	"	887
9.6 14 1 The 211	"	461				389
	••	461	critica, Kurk cyanostachya, Kurz	•••	"	889
	"	461	elegantissima, Hassk.	•••	"	416
• • • • • • • • • • • • • • • • • • • •	"	462	Falconeri, Munro v	ii s	387.	
	99	468				408
sp., Griff Ballota cinerea, D. Don	iv.	679	# W			892
		672	4. 7. 1. 1	•••	"	883
disticha, Linu limbata, Benth	"	680	*		"	406
	"	672	"1" # . 33		"	390
mauritiana, Pere	"	638	~ ~ .	•••	"	891
Balsamiflora deltoides, Gritt.	v.	000 (glaucescens, B16b	•••	,"	JU 1

Dombass		D	l Bambusa		
Bambusa	::	Page 405		Vol.	
globifera, Griseb		401	verticillata, Rottl		398
gracilis, Wall		394	verticillata, Willd		896
Griffithiana, Munro		411	villosula, Kurz	•••	391
Helferi, Muuro		400	viridi-glaucescens, Carr		391
hetirostachya, Munro	. ,,		vulgaris, Schrad		420
humilis, Rchb	. ,,	392	Wightii, Munro	"	
khasiana, Munro	. ,,	390	Wrayi, Stapf	. 33	394
Kingiana. Gamble	• ,,	393	sp., Griff	424	394
latiflora, Kurz	. ,,	407	sp., Wall vii. 387,		
lineata, Munro	. ,,	893		rii. 9,	
longispatha, Kurz	. ,,	407	Bambusifolia, Hk. f		786
Macala, Ham	. ,,	387		vii.	
macro, Wall	٠,,	382	Bamia angulosa, Wall	i.	341
marginata, Munro	. ,,	396	cancellata, Wall	,,,	342
Mastersii, Munro	. ,,	396	fusiformis, Wall	• ,,	342
maxima, Ham	. ,,	405	magnifica, Wall	• >>	342
M'Clellandi, Munro	. ,,	415	pungens, Wall	, ,,	341
microphylla, Griff	. ,,	384	rugosa, Wall	. ,,	342
monogyna, Griff		405	tetraphylla, Wall		341
nana, Roxb		890	sp., Wall		842
Neesiana, Arn		395	Banalia, Moq	iv.	716
nigrociliata, Büse		401	thyrsiflors, Moq	`,,	716
nutans, Wall		387	Bandura zeylanica, Barm	, ₹.	68
Oliveriana, Gamble		392	Banglium sulphureum,		
orientalis, Nees		395	Ham	. vi.	217
pallida, Munro	-	389	Banisteria bengalensis, Linn	. i.	418
patellaris, Kurz		406	tetraptera, Sonn		418
picta, Lindl		893	unicapsularis, Lamk		418
polymorpha, Munro	•••	389	Banksia speciosa, Koen		250
prava, Lindl		393	Baptisia ? nepalensis, Hook		62
pseudarundinacea, Steud		398	Barbarea, Br	•	134
pubescens, Lodd	••	404	arcuata, Rohb		134
pungens, Blanco		395	elata, Hk. f. & T		135
regia, Thoms		397	iberica, DO		134
reticulata, Rupr		386	intermedia, Bureau		134
Ridleyi, Gamble	• • • • • • • • • • • • • • • • • • • •	888	præcos, Fries	•••	134
Ritcheyi, Munro		402	vulgaris, Br		134
Rumphiana, Kurz	••	893	Barolaya, Wall	• •	115
101	•	414	longifolis, Wall		115
scandens, Bl schizostachyoides, Kurz		393	Barkania punctata, Ehrb	•••	663
and advisor Theory at	"	418	Barkhausia flexuosa, DC		394
alamanala Vana	"	397	1 4 4 1 7 100		393
Other Contract		392	to the same of the		398
		395	Roylei, DC iii.		398
		395	tenuifolia, DC	'	
spinosa, Roxb		391	1 - 1 - 7 -		482
sterilis, Kurz	-	392	acanthoides, Vahl		484
striata, Lodd		404	TOTALLA	"	485
stricta, Roxb		419	A		486
stridula, Moon		392	1 10 . 3 3		486
surinamensis, Rupr		404	Mann Mann		484
Tanca, Ham		388			490
teres, Ham Thouarsii, Kunth	• • • • • • • • • • • • • • • • • • • •	392	3 10 11. 7.		483
	• • • • • • • • • • • • • • • • • • • •	387			484
trigyna, Roxb Tulda, Roxb		387	1 11 11 1		488
:	• • • • • • • • • • • • • • • • • • • •	391	carulea, Roxb		489
		407		486,	
verticillata, Benth	• >>	201		200,	200

Barleria		Vol. I	Page	Vol. Page
conspicus, Nees		iv.	489	Barleriacanthus acanthoides,
			489	Oerst iv. 484
	•••	"	488	
oristata, Linn	•••	"	484	Barleriosiphon longiflorus,
cristata, Lamk	•••	"		
cuspidata, Heyne	•••	"	483	
dichotoma, Roxb	•••	"	488	Barlerites Hochstetteri, Oerst. iv. 483
diffusa, Wight	• • •	24	518	Barnardia indica, Wight vi. 348
elata, Dalz	•••	"	486	Barringtonia, Forst ii. 506
Gibsoni, Dalz		"	487	acutangula, Gærtn ,, 508
grandiflora, Dalz	•••	"	488	alata, Wall ,, 508
hexacantha, Moris		"	409	alba, Miers ,, 508
hirsuta, Wall		"	490	alba, Miq " 507
Hochstetteri, Nees		"	483	asiatica, Kurz " 507
Hystria, Linn		"	482	augusta, Kurz ,, 509
inæqualis, Bentu			489	ourlanies Gardn 500
		"	485	1
involucrata, IVees	•••	"	488	culindrostachua (1riff 500
laciniata, Wall	•••	"	486	77 10 . (7)
Iawii, T. Anders	•••	"		
longiflora, Linn. f	• • • •	"	485	? macrophylla, Miq ,, 507
longifolia, Linn	• • •	"	409	macrostacnya, Kurz ,, 509
longifolia, T. Anders.	• • •	"	485	pterocarpa, Kurz ,, 509
lupulina, Lindl	• • •	"	482	pubescens, Miers ,, 509
Macraei, Arn		"	485	racemosa, Bl ,, 507
macrophylla, Heyne	•••	"	489	rigida, Clarke ii. 510, iii. 581
montaua, Nees	•••	"	487	rubra, Miq ii. 507
montana, Wight & Ne		"	487	sarcostachys, Miq ,, 509
mysorensis, Roth	•••	"	484	speciosa, Forst ,, 507
napalensis, Nees			488	speciosa, Wall ,, 507
_ 2.7.4 _ 17.4.		33	490	BARBINGTONIEE ii. 506
	•••	**	484	Downstin St. Jan. Const. 104
nootifiora, Linn. f	•••	>>	488	
nuda, Nees	•••	"	488	77 7
nutans, Nees	•••	"		D11- 7:- " 00
paniculata, Wall	• :	,"	485	Basella, Linn v. 20
pentandra, Arn	1₹.	485,		alba, Linn " 21
pilosa, Wall	•••	iv.	486	canalifolia, Ham ,, 21
polystachya, Nees		"	490	cordifolia, Lamk ,, 21
polytricha, Wall	•••	,,	490	crassifolia, Wight ,, 21
Prionitis, Linn	•••	**	482	japonica, Burm " 21
pubiflora, Benth		•••	482	lucida, Linn ,, 21
? pungens, Wall	•••	"	517	nigra, Lour ,, 21
purpurea, Lodd	•••	"	487	ramosa, Jacq ,, 21
racemosa, Heyne			485	Trimm " 90
		"	484	BASELLES v. 2
		"	482	Danaia Linu 1.1 E40
rubra, Ham		"	488	De Verieur EAE
salicifolia, Heyne	•••	"	487	hatumana Danh . " E40
sepalosa, Clarke	•••	27	482	
spicata, Roxb	•••	"		caloneura, Kurz ,, 546
Spina-ceylanica, Neos	•••	"	484	canaliculata, Bedd , 541
Pspinosa, Wall	•••	"	417	cuneata, Bl ,, 548
Stocksii, T. Anders	•••	"	489	elliptica, Dals ,, 542
strigosa, Willd	•••	"	489	fuiva, Bedd ,, 545
terminalis, Nees	•••	"	49 0	grandis, Bedd ,, 540
tomentosa, Roth	•••	"	485	P hypoleuca, Miq ,, 542
tomentosa, Wall	•••	"	485	lævifolia, Bedd ,, 541
? trinervis, Wall		"	517	lanceolata, Bedd , 541
			486	lesidalia Dank " #44
vostita, T. Anaers		486,		Tabbii Manka " #40
sp., Hk. f. & T	TA.	-500 ,	-50 f	Lobbii, Clarke ,, 546

Denete		_	! Bauhinia		
Bassia		Page 544		Vol.	Page 276
longifolia, Linn		544	candida, Ait		284
malabarica, Bedd		545		,,	278
microphylla, Hook		545	commission Dales	,,	278
Moonii, Bedd				,,	284
	546			,,	
Motleyana, Clarke	iii.	672		,,	283
neriifolia, Moon	• ,,	545		,,	278
obovata. Forst	. ,,	546		,,	282
pauciflora, Bedd	, ,,	54l		,,	281
petiolaris, Bedd	, ,,	540	emarginata, Jack	,,	278
polyantha, Wall	. ,,	543	emarginata, Wall	,,	279
rubiginosa, Bedd	. ,,	541	ferrugines, Roxb	. ,,	283
sericea, Bl	, ,,	547	Finlaysoniana, Grah	. ,,	278
villosa, Wall	. ,,	544	Pfoveolata, Dalz	,,	277
Wightiana, Bedd	,,,	53 9	glabrifolia, Baker	,,	281
sp., Miq		542	minner 177-11	,,	282
Bassovia? Wallichii, Duna		232	intermitation Deal	,,	279
Batatas, Chois	·	201	involucellata, Kurz		282
acetosæfolia, Chuis		213	khasiana, Baker	••	281
Choisyana, Wight		190	Lawii, Benth	•••	277
edulis. Chois		202	lucida, Wall ii	278	, 285
1:441:- Ob -1	• • •	218	macrostachya, Wall.	••	281
' 🖚 .	•••	212	malakamiaa Dauk		277
		202		,,	281
paniculata, Chois		202	72		285
pentaphylla, Chois				•••	283
wanthorhiza, Bojer	:-	202		. ,,	991
Baterium validum, Miers		106		,,	
	. ▼.	491	parviflora, Vahl	. ,,	276
	53 8,		parvifolia, Teysm. & Binz	1. "	283
spinosa, Roxb	▼.	491		. ,,	283
Batratherum echinatum, Hk.			piperifolia, Roxb	. ,,	285
f. & T	vii.	144	polycarpa, Wall	. ,,	276
echinatum, Nees	,,	143	Pottsii, G. Don	. ,,	283
khasianum, Munro	,,	144	purpures, Linn	. ,,	284
lanceolatum, Nees		143	purpurea, DC	. ,,	277
micans, Nees		146	purpurea, Wall i	i, 276	3, 284
molle, Nees & Arn		147	racemosa, Lam		
nudum, Nees		146	racemosa, Vahl		279
plumbeum, Munro		146	reniformis, Royle		277
_ , ,,		144	retusa, Ham	•••	279
		147	roses, Kurs	•••	280
		143	rufa, Grah		280
serrulatum, Hoonst submuticum, Nees	"	145	P		277
sp., Wall vii. 116,	117		ruficarpa, Desv		283
					284
	147,		Dank	••	282
sp., Wight		145	1.01 D.1		280
Batschia laurifolia, Vabl	ii.	273		••	2 75
Baubinia, Linn	ii.	275	speciosa, Koxb	••	276
acida, Reinw	**	277	spicata, Kœn	••	
acuminata, Linn	**	276	timorana, Done	•••	276 975
anguina, Rowb	**	284	tomento-a, Linn		275
Benthami, Bedd	**	283	tomentosa, Wall	• • • • • • • • • • • • • • • • • • • •	277
bidentata, Jack	"	279	triandra, Boxb	• ,,	284
Blancoi, Baker	,,	278	unguioulata, Baker	. ,,	277
brachycarpa, Wall	"	276	Vahlii, W. & A	. ,,	279
bracteata, Grah	"	282	variegata, Linn	. ,,	284
Buchanani, Dosv	"	2 78	velutina, Wall	. ,,	280
VOL. VII.	••			(2
TUM: TAG					-

	Val '	Page	Begonia	v	ol. I	Page
BAUHINIE	ii.	61			ii.	655
Baumea, Gaud	vi.	674	1 0		,,	636
Brownei, Boeck	,,	675	1-4		"	648
crassa, Thw	"	675	Tananti A DA		"	639
riparia, Boeck	"	674	National Alberta		"	656
rubiginosa, Boeck	"	675	land lake Doub		"	645
Beaumontia, Wull	iii.	660	7.11/ A DA	•••	"	640
grandiflors, Wall	,,	660		100	••	
Jerdoniana, Wight	"	661	12		"	655
khasiana, Hk. f	"	661	lakaufaa Damb		,,	635
l longiflora, Lodd	"	660	l		"	646
multiflora, Teysm. & Binn.	. 27	661	martabanica, A. DC.		"	651
Beddomea, Hk. f	i.	566	megaptera, A. DC		"	646
indica, Hk . f	"	566	1		22	6 51
simplicifolia, Bedd	"	566	modestiflora, Kurz		"	640
Beesha baccifera, Schult	vii.	417	moulmeinensie, Clarke		,,	643
elegantissima, Kurz	"	416	nemophila, Kurz		,,	646
Rheedii, Kunth vii.	417	, 418	nives, Parish		,,	654
stridula, Munro	₹ii.	419	obliqua, Thunb	• • •	,,	638
travancorica, Bedd	"	419	ovatifolia, A. DC	• • •	"	642
Begonie, Linn	ii.	635	paleacea, Kurz	•••	,,	650
almoida, Clarke	"	637	? palmata, D. Don	•••	"	645
albo-coccinea, Hook	,,	654	Parishii, Clarke	•••	"	651
amcena, Wall	,,	642	parviflora, Wall	• • •	"	640
andamensis, Parish	"	650	parvuliflora, A. DC	•••	"	640
Arnottiana, A. DC	"	641	pedunoulosa, Wall	•••	"	639
barbata, Wall	"	646	pedunculosa, Wall	•••	"	656
barbata, Wall	,,	645	picta, 8m	•••	"	638
Bowringiana, Champ	"	645	procridifolia, Wall.	•••	"	648
Brandisiana, Kurz	,,	654	prolifera, A. DC	•••	,,	649
brevicaulis, A. DC	19	647	Rez, Putzeys	•••	"	647
canarana, Miq	17	652	Roxburghii, A. DC	•••	"	635
Catheartii, Hk. f	17	646	rubella, Miq	•••	"	652
concanensis, A. DC	,,	653	rubella, Wall	•••	"	642
cordifolia, Thw	"	6+1	rubro-venia, Hook	•••	"	645
crenata, Dryand	"	651	sandalifolia, Clarke	•••	"	649
delicatula, Parish	"	652	Satrapis, Clarke	•••	"	638
dipetala, Grah	"	655	scutata, Wall scutata, Wall	•••	"	642
Dux, Clarke	"	637	scutata, Wall	•••	"	639 646
echinata, Royle	"	638	sikkimensis, A. DC	•••	"	636
elongata, Wall	"	650	silhetensis, Clarke	•••	"	638
episcopalis, Clarke	420	644	sinensis, A. DC	•••	"	650
33 1. 4.1.		642 638	sinuata, Wall subovata, Wall	•••	"	642
Evansiana, Andr fallax, A. DC. (see Errata)	ii.	643	1 1 1 4 200 1 4	•••	"	653
	• • • • • • • • • • • • • • • • • • • •	652	subperfoliata, Wight	•••	"	643
fibross, Clarke		649		•••	"	650
? Finlaysoniana, Wall flaccidissima, Kurz	••	651	177	•••	"	640
		654	tenella, D. Don	•••	"	642
flocoifera, Bedd gemmipara, Hk. f		641		•••	"	652
777.11		643	tenuifolia, Dryand	•••	"	656
		636	tessarioarpa, Clarke	•••	"	636
		648	Thomsonii, A. DC	•••	"	647
Grahamiana; Wight	"	654	Thwaitesii, Hook	•••	"	652
Outer track	•••	647	trichocarpa, Dals		"	658
	"	648	triouspidata, Clarke	•••	"	637
44 4 777 - 11	"	650	triradiata, Clarke		"	687
guttata, Wall	"	555	1	•••	79	501

Begonia	Vol.	Page	Berberis		Vol. J	Page
tuberosa, Hb. Madr	••	655	angulosa, Wall		i.	ili
velutina, Parish		640	angustifolia, Roxb	•••	"	110
verticillats, Hook	••	649	aristata, DC		"	110
Wallichiana, A. DC		655	aristata, DC		,,	110
Wightiana, Wall		654	asistica, Rowb	•••	"	110
xanthina, Hook		644	asiatica, Griff	•••	"	111
sp., Wall	••	636	atroviridis, Wall			111
BEGONIACEÆ	•	685	Bealei, Fort			109
Beilschmiedie, Nees		121	brachybotrys, Edgew.	•••		109
assamics, Meissn		124	ceratophylla, D. Don			110
Brandisii, Hk. f		123	Chitria, Ham		"	110
Clarkei, Hk. f		122	concinna, Hk. f		"	111
fagifolia, Nees		122	coriaria, Royle	•••		110
fagifolia, Bedd		122	cratægina, DC			109
Gammieana, King	•••	124	cretica, Linn			109
globularia, Kurs		125	emarginata, Willd	•••		109
? longipes, Hk. f		123	floribunda, Wall			110
		123	heleropoda, Schrenck		"	109
Maingayi, Hk. f		123	hypoleuca, Lind'		,,	110
malaccensis, Hk. f	-	123	insignis, Hk. f. & T		,,	111
oppositifolia, Benth		124	kunzwarensis, Royle			109
70 1 1 17		121	Leschenaultiana, Wall.			109
Roxburghiana, Nees Roxburghiana, Dalz. &			Lyoium, Royle		••	110
Clib		122	macrosepala, Hk. f.		"	111
		122	Miccia, Ham		•••	109
TTT 9 424 TO 41		124	nepalensis, Spreng		,,	109
Belamcanda, Adans		276	petiolaris, Wall		,,	110
		277	sphærocarpa, Kar. &	Kir	"	109
chinensis, Leman		277			"	109
punctata, Moench	• • • • • • • • • • • • • • • • • • • •	244		•••	"	110
Belenia præalta, Done		524	1	•••	"	109
Beleropone? fulgida, Haesk	. 1V.	43	ulicina, Hk. f. & T	•••	"	111
Belostemma hirsutum, Wall	. iv.	388	1 11 . 727 11	•••	"	110
Belosynapsis kewensis, Hassk		616	umbellata, Lindl	•••	"	110
Benincass, Savi		616	vulgaris, Linn		"	109
cerifora, Savi		272	Wallichians, DC	•••	"	110
Benjaminea glabra, Benj		879	Wallichiana, DC		"	111
Bennettia affinis, Muell		380	Berchemia, Neck		"	637
Finlaysoniana, Br		378	calophylla, G. Don			686
Jackiana, Br		378	Edgeworthii, Laws.		"	638
pedicellata, Br	• • • • • • • • • • • • • • • • • • • •	378	7 777.77		••	637
pedicellata, Muell		880	floribunda, Wall	•••	"	637
phlebocarpa, Muell		380	? hamosa, Wall		"	641
wallichii, Muell sp., Wall v. 378			lawa, Wall		"	637
		745	1 10 10 10 10		"	638
Benthamia, Lindl		745	? oppositifolia, Wall.	•••		641
fragifera, Lindl		418	? parviflora, Wall	•••	• • • • • • • • • • • • • • • • • • • •	641
Bentinckia, Berry		418	? Poiretiana, DC		"	638
Condapanna, Berry		418	polyphylla, Wall		"	638
nicobarica, Becc	• • • • • • • • • • • • • • • • • • • •	186	Bergera integerrima, Roxl	 1. i. l		
Benzoin Neesianam, Nees		186	Kænigii, Linn	• • • •		508
sericeum, Hk. f. & T	•	107	nitida, Thw			505
BEEBERE#		167			••	502
BERBERIDEE	•	108	villosa, Wall Berghausia ascendens, Mu			
Berberis, Linn		109	courtallensis, Nees			244
acanthifolia, Wall		109			,,	242
ætnensis, Presl			elata, Arn		"	248
affinis, D. Don	. 11	110	Emodi, Endl	•••	"	

Berghausia	Vol.	Page	Bidaria	Vol.	Page
mutica, Munro	vii.	242	pergularioides, Thw		82
pallens, Arn	"	243	tingens, Done		81
scoparia, Munro vii.	241,	242	Bideus, Linn	iii.	309
tenella, Arn	vii.	243	? Bandanna, Wall	,,	310
Bergia, Linn sestivosa, W. & A	i.	251	bipinnata, Linn	,,	309
metivosa, W. & A	. ,,	251	bipinnata, Wall	,,	8 09
ammannioides, Rowb	"	251	calva, Clarke	, ,,	31 0
aquatica, Roxb	"	252	cerbus, Linn		309
capensis, Linn	"	252	chinensis, Wall		3 10
odorata, Edgew	"	251	chinensis, Willd	,,,	309
pentandra, Guill. & Perr.	"	251	decomposita, Wall	,,	3 10
suffruticosa, Fenzl	"	251	fervida, Lauk	,,	307
trimera, Fisch. & Mey	"	252	fixa, Lamk		3 07
verticillata, Willd	2)	252	frondosa, Ham		309
Bernieria nepalensis, DC	iii.	391	leucantha, Willd		809
Berrya, Roxb	i.	383	piloss, Linn	,,	309
Ammonilla, Rowb	,,	3 83	pilosa, Linn	,,	309
mollis, Wall	"	383	pinnatifida, Heyne	,,	310
Berthelotia lanceolata, DC	iii.	272	Ramtilla, Wall	,,	3 03
Bertieria fasciculata, Bl	iii.	95	repens, D. Don		809
javanica, Bl	,,	95	rigida, Hort. Calc		3 10
Bessera inermis, Spreng	₩.	328	trifida, Roxb	"	309
Beta, Linn	▼.	5	tripartita, Linn	, ,,	809
benghalensis, Roxb	,,	5	tripartita, Wall	,,	309
orientalis, Roth ,	,,	5	Wallichii, DC		310
vulgaris, Linn	"	5	Biebersteinia, Steph		427
Betonica lævigata, D. Don	iŸ.	659	Emodi, J. & S		427
Betula, Tourn	▼.	599	odora, Royle	• • • • • • • • • • • • • • • • • • • •	427
acuminata, Wall	,,	59 9	Biforis benghalensis, Wall		696
affinis, Endl	"	599	glauca, Wall		696
alnoides, Ham	"	599	Bigelovia Kleinii, W. & A		200
Bhojpattra, Wall	,,	599	lævicaulis, Miq		200
Castanæ, Ham	"	59 9	lasiocarpa, W. & A		200
cylindrostachys, Wall	"	599	muriantha, Mia.		200
Jacquemontii, Spach	"	599	Roxburghiana, W. & A		200
leptostachya, Wall	"	600	Roxburghiana, Wight Cat.	. ,,	200
nitida, D. Don	"	599	setidens, Miq	, ,,	200
utilis, D. Don	"	599	stricta, Bl	,,,	200
Betulaster acuminata, Spach	₹,	600	Bignonia adenophylla, Wall.	iv.	881
affinis, Spach	,,	600	amana, Wall		384
cylindrostachya, Spach	"	599	atrovirens, Roth	• • • • • • • • • • • • • • • • • • • •	380
nitida, Spach	"	600	Azedarachta, Koen	•••	877
BETULE	Ÿ.	598	caudata, Mig		382
Beurreria aspera, G. Don	i٧.	142	chelonoides, Linn. f		382
glabra, G. Don	,,	186	crispa, Ham		879
lævis, G. Don	"	142	flmbriata, Wall		383
punctata, G. Don	"	142	Ghorta, Ham		884
retusa, G. Don	"	148	glauca, Done		378
Bhesa lapsu Rhesa	ï.	622	glauca, Wall		376
Moja, Ham	"	622	indica Line		878
paniculata, Arn	,,	622	laeta, Wall	•••	876
Biancza mimosoides, Todaro	ii.	256	longifolia, Willd	••	884
Sampan, Todaro	"	255	longissima, Lour	• • •	879
scandens, Todaro	"	256	macrostachya, Wall		376
Bidaria elegans, Dalz. & Gibs.		82	multijuga, Wall		884
elegans, Done	"	82	osyphylla, DC		876
inodora, Done	"	38	Paganelia, Ham		884
	••			••	_

Bignonia		_	I Dingles 217	_
		Page 878	Blackwellia Vol.	Page 597
Dominus Wall		388	coylanica(seylanica),Gardo. ii.	
and dellaritation to	"	381	dasyantha, Turos "	597
amathasan Timm B	"	379	fætida, Wall ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	597 5 96
amadhassa Damb	"	380		596
aktuu luku 10 uu k	37	379	nepalensis, Wall ,, propinqua, Wall ,,	597
	"	882	propingua, Wall ,,	
	77	377	spiralis, Wall ii. 598	
	"	378	tetrandra, Wight ii. tomentosa, Vent ,	597 596
wylocarpa, Roxb	"	883	govienies Cond-	697
BIGNONIACEZ	iŸ.	376		597
Binnendykia trichostylis,		0.0	sp., Griff ,, Bladhia crispa, Thunb iii.	524
	i.	379	D1-1	805
Kurs Biophytum, DC	j.	486	albu Eduara	805
adiantoides Wight		487	hienida Edwar	305
Apodiscias, Hk. f	"	437	l letifulie DC	305
	"	437	homboides Com	805
	"	437	Blairia nodifiora, Guertn. iv.	568
inaan madim - 1177-14	"	438	737 7	67
nervifolium, Thw	"	437	Blastus, Lour ii.	528
	"	438	l cochinchinamaic Tana	528
polyphyllum, Munro	"	439	Bleekeria Zollingeri, Miq v.	421
poterioides, Edgew	"	437	Blepharis, Juss iv.	478
proliferum, Arn	"	438	l senerime Vec	478
Reinwardtii, Walp	"	437	hooshoosingulia Daw	478
sensitivum, DC	"	436		479
sesbanioides, Edgew	"	437	l madamaamakansia Daab	479
verticillatum, Wight	"	439	malingias fulia Dana	479
Biota pendula, Endl	₩.	646	l manama Dath	479
Birchea teretifolia, A. Rich.	vi.	24	aindina Stocke	479
Bischofia, Bl	₹.	844	Blepbarispermum, Wight iii.	276
Cumingiana, Done		345	noticlass DC	276
javanica, Bl	"	345	enhagueil. DC	276
oblongifolia, Done	"	345	Blephariste uma, Wall ii.	441
Roeperiana, Done	"	345	sorymbosum, Wall	441
Toui. Done	"	345	Btepharochloa ciliata, Endl. vii.	94
trifoliata Hook	"	845	Bletia angustifolia, Gaud. v.	813
Bistella geministora, Delile Bixe, Linn.	ű.	899	hicallosa D Don . wi	196
Bize, Linn	i.	190	Dakia D Don	4
Orellana, Linn	,,,	190	flava, Wall v.	817
Bix##	ï.	189	anaminifolia D Don	857
Bixine	j.	189	Maseca, D. Don ,,	851
	iii.	667	quadrijida, Ham ,,	851
neriifolius, A. DÓ	,,	642		817
Sebusii, Van Huerck &				848
Muell	"	642	Blighia sapida, C. Kon 1.	685
venenatus, A. DC	,,	642	Blitanthus nepalensis, Robb. v.	8
Blachia, Baill		402	Blitum frutescens, Rumph iv.	714
andamanica, Hk. f		403	virgatum, Linn v.	5
calycina, Benth	"	402	Bluffia Eckloniana, Nees vii.	64
denudata, Benth	"	408	Blumes, DC iii. 260,	671
reflexa, Benth		402	alata DO iii	271
umbellata, Baill	"	402		260
Blackburnia monadelpha,				261
Roxb	iii.	619	anagallidifolia, DC. iii. 261,	
oppositifolia, Rozb		619 I	angastifolia, Thw iii.	
Blackwellia acuminata, Wull.	ii.	596		260
	-		, 17	

Blumea	Vol. 1	Page 1	Blumes	Vol. P	200
	Vol. 1	270	muralis, DC	iii. 2	
		271	14 50	•	263
L.1	"	270	myriocephala, DC	,, -	269
Laulan DO		262	myriocephala, Thw.		269
	,,	266	? napifolia, DC	"	263
Belangerians, DC		261	neilgherrensis, Hk. f.		261
bifoliata, DC	. ,,	263	nodiflora, Hk. f	" "	262
Chamissoniana DC		671	1 1 'DA'	"	268
Chamissoniana, DC.		268	obovata P Clarke	"	265
chinensis, DC		672	11 1 100	"	261
eichoriifolia, DC		263		"	266
cinerascens, DC	• • • • • • • • • • • • • • • • • • • •	267	14 11 700	"	261
Clarkei, Hk. f		672	10 11 mg	,,	265
	,,	267	phyllostachya, DC	,,	261
crinita, Arn	. ,,	672	na	"	268
cuneifolia, DC	• • • • • • • • • • • • • • • • • • • •	269		····/ "	271
densifiors, DC	i.i. 270.			iii. 260,	
	'		pubiflora, DC		262
	i ii.	266	purpurea, DC		2 62
ezcisa, DC		269	racemosa, DC	··· "	268
	iii. 262 ,	0/2	riparia, DC	"	264
fistulosa, Kurz		262	runcinata, DC	"	263
	,,	270	runcinata, Wall	"	268
	,,	267	semivestita, DC	"	672
	,,	263	senecioides, DC.	"	298
	,,	265	senecionidea, Edgew.	,,	262
	,,,	262	sericans, Hk. f	"	262 269
	62, 265,		sessilifolia, Kurz	,,	268
	iii.	269	sikkimensis, Hk. f	**** ,,,	200 264
	,,	271	sonchifolia, DC	,,	269
	,,	264	spectabilis, DC		
Heyneana, DC	,,	263	spinellosa, DC		0/2
hieracifolia, DC	"	263	subcapitata, DC	iii.	
hieracifolia, Hk. f. & T	,,	267	subsimplex, DC	iii. 265,	
hispidula, DC	,,	672	tenella, DC		
holosericea, Dalz. & Gib		262	trichophora, DC	,,	261
holosericea, DC			trigona, DC	,,	263
	iii.	269	trisulca, DC	*** ,,	259
	,,	265	vernonioides, DC		271
	,,	265	villosa, Schultz	,,	263
Jacquemontii, Hk. f	,,	265	virens, DC		264
	"	265	viscosula, DC	iii. 26 5,	
	iii . 263 ,		Wightiana, DC	iii.	261
laciniata, DC	iii .	264	Blumenbachia halepe		
	,,	672	Koel	vii.	
	,,	672	Blumeodendron Tokbrai, l		427
lapsanoides, DC	,,	264	Blysmus, Panz	, v i.	
leptoclada, Dalz. & Gibs.	iii. 262,	263	compressus, Panz	,,	660
leptoclada, DC	,,	262	rufus, Link		661
Leschenaultiana, DC	,,	671	Blyxa, Thouars	•••	660
P leucanthema, DC	,,	270	ceylanica, Hk. f	,,	661
longifolia, DC	iri. 269,	672	echinospermu, $Hk. f.$,,	661
macrostachya, DC		263	Griffithii, Planch	,,	66 L
malabarica, Hk. f	,,	267	lancifolia, Hk. f	,,	661
Malcolmii, $Hk. f.$,,	266	octandra, Planch	,,	661
membranacea, DC .	iii. 265,	672	oryzetorum, Hk. f		661
	iii,	266	Roxburghii. Rich		660
3672 11 0	,,	269	Talboti, Hk. f	,,	661
•					

	Vol.	Page ,	Boehmeria	7	rol. 1	Pege
Bobartia (lapsu Robartia)	101.		Puya, Hook	`	₹.	592
indica, Linn	vi.	602	ramiflora, Bedd	•••	,,	575
Bobea glabra, Korth	iii.	127	rotundifolia, D. Don	•••	"	579
Wallichiana, Korth	"	127	rugosissima, Miq	•••	11	578
Bobua laurina, DC	ii i.	573	rugul su, Wedd	•••	"	577
Bocages, St. Hil	i.	92	salicifolia, D. Don		,,	591
coriacea, Hk. f. & T	"	93	sanguinea, Hassk	•••	"	581
Dalzellii, Hk. f. & T	,,	92	scabrella, Gaud	•••	"	578
elliptica, Hk. f. & T	,,	92	sidæfolia, Wedd	•••	"	576
obliqua, Ilk. f. & T.	,,	93	spiciflora, Bl	•••	17	580
Thwaitesii, Hk. f. & T	."	92.	squamigera, Wedd	•••	"	580
Boss, Commers	ì٧.	36 t	subperforata, Wedd.	•••	"	580
amplexicaulis, Parish		364	sylvatica, Hausk	•••	"	590
flocculosa, Clarke		3 65	tenacissima, Guud	•••	"	57 6
herbacea, Clarke		365 365	ternifolia, D. Don	• • •	"	579 578
multiflora, Br	• • • • • • • • • • • • • • • • • • • •	365	tomentosa, Wedd travancorica, Bedd	•••	**	575
prolixa, Clarke		365		•••	"	589
sp., Hk. f. & T		575	velutina, Done viminea, Wall	• • •	"	581
Boehmeria, Jacq acuminata, Gaud		566		•••	"	578
		581	1 m . a	•••	iv.	362
		590	A124	•••		362
11 77 1		576	4.1 011	•••	"	362
candicans, Hassk canescens, Wedd	• • • • • • • • • • • • • • • • • • • •	579	Griffithii, Clarke	•••	"	362
caudata, Poir		578	hirauta, Clarke	•••	"	362
caudigera, Wedd		579	Boenninghausenia, Rchb.		i.	486
comosa, Wedd		576	albiflora, Rehb		-	486
cuspidata, Bl		580	Boerhaavia, Linn	•••	iv.	708
dichotoma, Hassk	•••	590	ascendens, Willd			709
didymogyne, Wedd	• • • • • • • • • • • • • • • • • • • •	576	orispa, Heyne		"	709
diffusa, Wedd	•	576	diffusa, Linn		"	709
? frondosa, D. Don	•••	581	elegans, Chois		"	710
frutescens, D. Don	•	592	fruticosa, Dalz		"	710
Hamiltoniana, Wedd		579	grandiflora, A. Rich.	•••	"	710
Helferii, Bl		576	hirsuta, Willd	•••	"	709
heteroidea, Bl		579	procumbens, Hb. Bank		"	709
Hugeliana, Bl		580	repanda, Willd	•••	,,	709
hypoleuca, Hochst	• • • • • • • • • • • • • • • • • • • •	591	repanda, Wall		,,	709
incana, Hassk		589	repens, Linn		,,	709
interrupta, Willd		549	repens, Delile		"	709
javanica, Hassk		549	rubicunda, Steud		"	710
Kurzii, Hk. f		577	rugosa, Rottl		,,	709
macrophylla, D. Don		577	scandens, Gibs		"	710
macrostachya, Wedd		578	stellata Wight		"	710
malabarica, Wedd		57 5	umbellata, Wight	•••	"	709
mauritiana, Wedd		578	verticillata, Poir	•••	"	710
melastomoides, Griff	. ,,	583	viscosa, Lag	<u></u>	"	709
nana, D. Don	. ,,	581	Boissiera Danthoniæ, A.		Vii.	362
nervosa, Madden	. ,,	577		lbo-		
nivea, Hook. & Arn	. ,,	576	phyllum	•••	٧.	752
ourantha, Miq	. ,,	578	Boltonia, L'Hér:	•••	ii .	
ovalis, Miq	. ,,	581	indica, Benth	•••	,,	249
parvifolia, Wedd	. ,,	593	Вомвасеж	•••	į.	318
pauciflora, Bl	. "	593	Bombax, Linn	••	i.	349
pendulifora, Wedd	. ,,	577	Ceiba, Burm	•••	"	349
platyphylla, D. Don	. ,	578	Gossypium, Linn	•••	**	190
polystachya, Wedd.	. ,,	579	heptaphyllum, Cav	•••	"	349

Bombax	W-1	D	Borassus	₩.1	B
1 1 127 11	,,,	Page 349	flabelliformis, Murr,	AOT	Pege 483
		849	Gomutus, Lour.	7 20	421
		850	Borreria gracilis, Miq.	iü.	
. A. J. J		350		-	200
		185	1 20		200
Bonatea benghalensis, Griff herbacea, Wall		135			48
		135		ï.	851
	• • • • • • • • • • • • • • • • • • • •		1 0 100 11 14 1		852
		284	Boschniackia, C. A. Mey	i٧.	327
brachiata, Link & Otto brachiata, Benth		284			328
1	.**	285	1		827
	•	285	himalaica, Hk. f. & T Bosea, Linn		
ciliata, Spreng cordifolia, Spreng	•••	282	Bosea, Linn		
		285			716
cyanea, Griff	•••	285	1 4 3 44 771 4		716
grandiflora, Spreng		8 57	10.00		716
humilis, Spreng		283	1 V Ti		716
hyssopoides, Benth		285	I TO 111 TO 1	•	527
marginata, Spreng		286			528
minima, G. Don	• • •	284	glabra, Roxb	"	528
minima, Wight		286	serrata, Rossb	-	528
oppositifolia, Spreng		283	thurifera, Roxb	167	
parviflora, Benth	• • • • • • • • • • • • • • • • • • • •	285	Bothriospermum, Bunge iv.		
peduncularis, Benth		285	asperugoides, Sieb. & Zuco.		152
procumbens, Benth	••	285	? marifolium, A. DC	"	167
pulegiifolia, Spreng			tenellum, Fisch. & Mey	"	107
punctata, G. Don	•••	266	Botryadenia Gmelini, Fisch.	***	047
pusilla, Benth		284	& Mey	iii.	247
pusilla, Griff		286	Botryolotus cachemyrianus,		00
reptans, Spreng	* **	284	J. & S		88
rigida, Benth	,,,	285	Botryophora, Hk. f	₹.	476
Rothii, Dietr	• 17	285	Kingii, Hk. f	"	176
Roxburghiana, Dietr	. ,,	285	Botryosicyos pentaphyllus,		800
ruelloides, Spreng	••	285	Hochst Boucerosia, W. & A	•	289
serrata, Griff		284	Boucerosis, W. & A	iv.	77
tenuifolia, Spreng	,,,	286	adscendens, Wall	,,	76
Vahlii, G. Don		281	Aucheriana, Done	"	78
verbenæfolia, Benth	. ,,	285	campanulata, Wight	>>	77
veronicæfelia, Spreng	. ,,	285	crenulata, W. & A	"	77
_ Wightii, Benth		285	diffuse, Wight	,,	78
BONNETIEE	•••	280	edulis, Edgew	"	. 76
Boorans, Hardwicke			Hitchinia, Done	,,	78
Boottia, Wall		662	lasiantha, Wight	,,	78
cordata, Wall		662	pauciflora, Wight	,,,	78
BORAGER		184	Stocksiana, Boiss	**	76
Boraginea, Edgew		169	umbellata, W. & A	. ,,	77
Boroginea, Wall		148	Bouches, Cham	i▼.	564
BORAGINES		184	hyderabadensie, Walp	"	561
Borago africano, Linn	í₹.	154	marrubiifolia, Schau	;;	564
indica, Linn	"	158	Bones, Meissn	ii.	20
Pepinulosa, Roxb	"	153	Brandisiana, Kurz	29	21
verrucosa, Forsk	37	154	burmanica, Griff	,, '	21
seylanica, Linn	"	154	diversifolia, Miq	"	21
BORASSEÆ		405	Pgandaria, Bl	"	21
Borassus, Linn		481	macrophylla, Griff	. "	21
ethiopum, Mart	72	482	microphylla, Griff ii. 2		
dichotomus, White	**	482	? myrsinoides, Bl		21
flabellifer, Linn	. 99	482	oppositifolia, Meissn	"	21

Wal De	ge Brachystemma	Wal Page
Vol. Pa Boymia glabrifolia, Champ. i. 49	calycinum, D. Don	Vol. Page i, 285
eutocomo Inse	Brachytome, Hk. f	222 100
- · · · · · · · · · · · · · · · · · · ·	20 117 111 1 11 777 4	100
Brachyactis, Led iii. 2		7. 308
	coriacea, Wall	460
	curonata, Wall	v. 324, 826
	R4 37.7. W. N.	▼. 828
	53 Finlaysoniana, Wall.	909
wangtuensis, Clarke (vide	hirsuta, Roxb	, 811
Conyza) ,, 28	18 lævigata, Wall	914
Brachycome, Cass iii. 24		,, 308
? assamica, Clarke ,, 24		B14, 817, 818
Brachycoris parviflora, Schrad. iv. 26	32 littorea, Stoud	
Brachylepis, W. & A iv.	7 mollis, Wall	
nervosa, W. & A ,,	7 multilocularis, Spreng.	907
Brachynema, Griff iv. 60	0 nitida, Roxb	, 811
ferruginea, Gritt " 60	00 nitida, Wall	, 807
Brachypodium, Beauv vii. 3t		, 811
Barrelieri, R. & S ,, 36	oblijua, Wight	,, 808
cæspitosum, R. & S ,, 36		,, 308
constrictum, Presi ,, 36	ovata, Wall	, 322
corniculatum, DC " 36	philippensis, Ham	, 807
Fontanesianum, Nees ,, 36	pinnata, Roxb	, 817
Fontanesii, Nees ,, 36		, 307
gracile, Beauv " 36		,, 821
longearistatum, Boiss " 36	8 zeylanica, Gerto	, ,, 811
nevalense, Nees ,, 36		v. 73
pinnatum, Beauv ,, 36		" 78
rupestre, R. & S ,, 36		,, 73
scaberrimum, W. & A , 36		,, 78
sylvaticum, Beauv ,, 36		,, 78
tataricum, Munro ,, 37		,, 78
tenellum, B. & S ,, 35		,, 78
tenuistorum, R. & S ,, 35		
Wattii, Clarke ,, 86	3 siliquosa, Miq	,, 78
Brachypterum Benthami, Thw. 11. 24		" - 78
canarense, Dalz. & Gibs " 24		,, 78
elegans, Thw ,, 24		, 78
robustum, Dalz. & Gibs ,, 24		iv. 272
scandens, Dalz. &. Gibs , 24	O Brandisia, Hk. f. & T.	iv. 257
Brachyramphus, DC iii. 40		,, 257
Heyneanus, Wight ,, 40	discolor, Hance	, 257
obtusus, DC ,, 41	6 Hancei, Hk. f	" 257
sonchifolius, DC ,, 40	Brandtia holcoides, Kunth	vii. 71
sonchifolius, Thw ,, 40		i. 118
taravacoides, UC ,, 40		, 118
Brachyspathasylvatica, Schott vi. 51	8 Brassaia, Endl	ii. 732
seylanica, Schott , 51	8 actinophylla, Endl	" 782
Brachystelms, Br iv. 6		,, 732
attenuatum, $Hk.f.$,, 6	5 Brassaiopsis, Done. & Plan	oh. ii. 785
Beddomei, Hk. f ,, 6		,, 788
glabrum, Hk. f ,, 6	5 alpina, Clarke	, 736
lævigatum, Hk. f ,, 6	5 confluens, Beem	ii. 73 2, 785
maculatum, Hk. f ,, 6		ii. 787
parviflorum, Hk. f ,, 6		" 786
▼olubile, Hk. f ,, 6		" 785
Brachystemma, D. Don i. 28	b hispids, Seem	, 786

Brassaiopsis	V-1	Do oo	Bridelia	T-1 '	Do me
Hookeri, Clarke		Page 737	107 11	. ▼ol.:	268
mitis, Clarke		736	7 . TTI 6		269
palmata, Kurz		735	70 387 .11		305
simplicifolia, Clarke		735	L		269
speciosa, Done. & Planch.		737			269
December 1	ï.	155	-1 117 - 11		275
alba, Hk . f . & T		157	T77 A		273
	•••	158	- 17 - TT1- 0- A		274
campestris, Linn	"	156	crenulata, Roxb		268
TO	•	158		• • • • • • • • • • • • • • • • • • • •	273
	• • • • • • • • • • • • • • • • • • • •	158		• • • • • • • • • • • • • • • • • • • •	271
A. 21		157	dasycalyx, Kurz glauca, Bl v	. 272,	
~ · · · · · · · · · · · · · · · · · · ·		157		•	272
111. A 0. M		157			271
		156	2 4 41 337 11	. ,,	315
	• • • • • • • • • • • • • • • • • • • •	156			272
. 1 T t		156		. ,,	271
		156	? lanceæfolia, Roxb		271
quadrivalvis, Hk, f. & T		156		- 30,	271
Rapa. Linn Stocksii, Hk. f. & T		156		. ,,	
Slocksu, HK. I. & I	••	156	minutiflora, Hk. f	,,	273
Tournefortii, Gouan		156	377.33	,,	269
trilocularis, Hk. f. & T			montana, Wall	,,	268
Willdenovii, Boiss		157		. ,,	268
BRASSICE		129	oblongifolia, Hk. & Arr	1. ,,	275
Brathys nepalensis, Bl		256	ovata, Dens	,,	271
Braya, Sternb. & Hoppe	1.	155	ovata, Kurz	,,	272
alpina, St . & H	3)	155		. ,,	279
glabella, Richards	,,	155		,,	272
? oxycarpa, Hk. f. & T	"	155	pubescens, Kurz	r) 27 0,	
rosea, Bunge	"	155	pustulata, $Hk. f.$	▼.	271
Thomsoni, Hk. f. & T	,,	155		,,	268
tibetica, Hk. f. & T	. ,,	155		,,	269
uniflora, Hk. f. & T		155		,,	270
Breweria, R. Br	i₹.		rhamnoides, Griff	,,	271
cordata, Bl	,,	223		,,	273
elegans, Chois	,,,	224	scandens, Willd	,,	270
evolvuloides, Chois	,,	224	sinica, Grah	,,	274
latifolia, Benth Roxburghii, Chois	"	224	spinosa, Roxb	,,	268
Roxburghii, Chois	,,	223	stipularia, B/	,,	270
Brewstera crenata, Koem	i.	416	stipularis, Hk. & Arn	. ,,	282
Breynia, Forst	₹.	32 9	tomentosa, Bl	,,	271
angustifolia, Hk. f	, ,,	330		. ,,	274
cernua, Muell		331	Zollingeri, Miq	,,	270
coronata, Hk. f		33 0	Brindonia indica, Thouars	. i.	261
discigera, Muell	,,	331	Briza, Linn	.: vii.	336
fruticosa, Hk. f	,,	331	1 12-2	,,	325
oblongifolia, Muell	,,,	330	TO	,,	320
paniculata, Spreng	,,	332	Eragrostis, Vill	,,	321
patens, Benth		329)	,,	336
racemosa, Muell		331	1	,,	336
reclinata, Hk. f	,,,	331	1	,,	336
rhamnoides, Muell		3 30	A Secretary Afficiency	"	320
viryata, Muell	• • •	331	1 64 \$ 74 77 \$ \$	"	317
Bridelia, Willd		267	Brizopyrum mucronatum,		
acuminata, Wall		323	Nees	vii.	328
alnifolia, Griff		274	Brombeadia, Lindl	v i.	20
amæna, Kurz		26 9	0	,,	20
-					

Duombaadia	37 -1	.	Bromus	•	7.1 ·	Daa
Bromheadia Finlaysoniana, Rchb. f	voi. ▼i.	Page 20	nemoralis, Huds		/ 01 ▼ii.	Page 358
		20	77*11			358
Bromus, Linn	vii.			•••	"	361
-1 - A'A OL A		359			"	361
_1	"	309	Tr A	••	"	360
747 . 777 1	"	358		••	"	361
D-1	"	361	D-2	•••	"	361
	"	361	170 TO	•••	**	363
annuus, Jacq	"	359		•••	"	363
arenaceus, Pourr	,,	360		•••	**	361
arenarius, Thom	"	361		• • •	"	329
arvensis, Duthie	"	358		•••	,,	358
asper, Murray		358	Pseudo-asper, Schur	•••	"	358
asper, Hk. f. & T	"	36 0		•••	,,	357
atticus, Steud	"	361		•••	"	358
chapprianus, De Not	"	360	1 2 t	••	"	360
chrysopogon, Viv	"			•••	"	359
ciliatus, Linn	"	357		•••	"	357
commutatus, M. Bieb	"	361		• • •	"	360
compactus, Hort	"	360	1 1/ 1/ 10:1	•••	"	
confertus, Biob	"	360		•••	"	361
confinis, Neos	"	358		• • •	,,	358
confinis, Strach. & Winterb.	"	359		• • •	"	363
crinitus, Boiss. & Hoh	"	359		• • •	,,	360
Cyri, C. A. Mey	"	361		•••	"	361
dactyloides, Roth	"	309	I A sale in Proceedings	• • •	"	369
Danthoniæ, Trin	**	362			٠,,	359
dubius, Jacquem	"	373		•••	**	359
dumetorum, Lamk	"	358		• • •	"	361
dumosus, Vill	"	363		• • •	"	353
erectus, Moris	"	360		•••	"	361 357
Ferronii, Mabelli	"	360		•••	"	357
giganteus, Linn	"	353 358		•••	"	361
giganteus, Vill	"	360	velutinus, Nooc. & Balb. villiferus, Stead	• • •	"	361
glomeratus, Tausch	"	363	sp., Hk. f. & T. vii. 350, 3	31	254	
gracilis, Leyss	"	363	Brongniartia coriacea, Bl.	JI,	Σ.	114
gracilis, Weig	"	359	1 2 4 4 4	•••	i.	372
gracillimus, Bunge		358	bracteosa, Guill. & Perr.	•••		373
himalaicus, Stapf		358	Broughtonia? fusca, Wall.		٧.	844
hirsutissimus, Cyrill		358	1 2 377.11			836
hirsutus, Cart	•	360	7 7 787 11	•••	"	843
humilis, Cav hordeaceus, Linn		360	1 75 12 4	•••	٧.	490
		357	TF4	•••		490
		361			i.	381
japonicus, Thunb Kochii, C. Gmel		361	ninka Dami		,,	381
lateripronus, St. Laz		359				517
7111 T M		357	D =		i.	380
		362	30.00	•••	i.	520
macrostachys, Desj membranaceus, Jacquem.		362	1.1. O		"	520
mollis, Linn	"	360	111 THE 11	•••	"	521
mollis, Duthie	• • •	361	Don't	•••	"	521
montanus, Scop	••	358	YET 11		"	520
multiflorus, Host		361	D	•••	ii.	437
multiflorus, Kar. & Kir		361	1		"	438
Munroi, Boiss	"	358		•••	"	438
Myurus, Heyne	"	287		•••	••	437
nanus, Weig	31	360	1 DC		,,	452
,			· . ·			

Bruguiera	V ol. ∶	Page	Bryonia		∀ol	Page
malabarica, Arn	22	438	sinuosa, Wall		ii.	625
parietosa, Griff		438	tenella, Boxb		,,	62 6
parviflora, W. & A	• • • • • • • • • • • • • • • • • • • •	438	trifora, Wall	•••	,,	626
Rheedii, Miq	,,	437	tubistora, W. & A		,,	611
Rumphii, Bl		438	umbellata, Klein		"	625
Wightii, Bl	"	437	umbellata, Wall	•••	,,	609
Brunella, Linn			Wightiana Wall		"	623
hispida, Benth		671	Bryonopsis courtallensis,			628
ovata, Wall	"	671	erythrocarpa, Naud.		>>.	623
vulgaris, Linn	•••	670	laciniosa, Hk. f		**	623
Bruniera vivipara, Franch.	, vi.	5 58	Bryophyllum, Salisb		ii.	418
Bryobium, Lindl	₹.	785	calycinum, Salisb			418
Bryocarpum, Hk. f. & T	iii.	501	pinnatum, Kurs		"	418
himalaioum, Hk . f . $& T$		501	l =="s /==	 me n-	,,	
Bryomorpha rupifraga, Kar.		001	tosa, Spreng		i.	375
A. 77	•	243	Buchanania, Roxb.		• •	22
	ii.	622	1 • *			24
-1f-1:- 17h D-441		621		•••	;;"i	4, 24
-141		623			ii.	28
	"	625				24
amplesicaulis, Lamk		619	arborescens, Bl		>7	41
callosa, Hb. Rottl			auriculata, Bl	•••	"	24
cheirophylla, Wall	"	614 624	bancana, Miq		"	23
cissoides, Wall	"		glabra, Wall		"	24 24
cochinchinense, Lour		611	intermedia, Wight		,,	
deltoidea, Arn	99	626	lanceolata, Wight	•••	"	24
dioica, Jaoq. see Errata	"	628	lancifolia, Rozb	•••	,,	24
epigæa, Rottl	"		latifolia, Roxb		"	28
filicaulis, Wall	,,	627	laxiflora, Kurs		,,	24
P filiformis, hoxb	"	624	longifolia, Bl		. "	24 23
Garcini, DC	**	6 3 0 6 2 8	lucida, Bl		"	41
glabra, Roxb	••	623	macrophylla, Bl		"	24
gracilis, Wall	"	621	palembanica, Bl. P		"	24
grandis, DC grandis, Idon	,,	621	petiolaris, Miq sessilifolia, Bl		"	24
	6ÏI.		the section of the se	••	i.	559
1 . 4 17 117 . 11	611,		l.1	•••	ii.	24
	ii.	624		•••		16
• • • • •		622	D	•••	i ∀.	297
TTT 0 A	**	623	angustifolia, D. Don	•••		299
1 DO	,,	628	muliation Title	•••	"	299
Moimoi, Sor	**	621	biflda, Ham	•••	,,	299
	"	624	coccinea, Benth		**	299
mucronata, Bl mysorensis, Miq	"	623	cruciata, Ham	•••	,,	298
mysorensis, Wall		624	densistora, Benth		**	299
nepalensis, Bor	"	625	densistora, Hk. & Arn.	···	"	298
odorata, Ham	"	626	euphrasioides, Vahl.	•••	,,	299
odorata, Wall	"	626	hispida, Ham	•••	"	298
? ozyphylla, Wall	"	624	hyderabadensis, Roth		"	299
palmata, Wall ii. 607,	6ï1.	621	longiflora, Arn	•••	"	800
P pedunculosa, Ser	ii.	613	Macuria, Ham		"	800
Perrottetiana, Ser		627	orobanchoides, Br	•••	"	299
pilosa, Roxb	"	627	phænicea, Benth		"	299
Rheedii, Bl	"	625	Schimperiana, Hochst		"	298
rostrata, Rottl	"	627	stricta, Benth		"	298
sagittata, Bl	"	625	sumatrana, Miq	•••	"	298
scabrella, Linn. f	**	628	tetrasticha, Benth	•••	99	298
sinuata, Wall	"	628	Wallichii, Benth	•••	,,	300

			Dulhankellam
Bucklandis, Br		Page 429	Bulbophyllum Vol. Page
Bucklandis, Br	ii.	429	Careyanum, Spreng. v. 760, vi. 188
populifolia, Hk. f. & T	-	429	Careyanum, Wall v. 760 cariniforum, Robb. f 767
	. iv	60	caudatum, Lindl ,, 759 cauliflorum, Hk. f. v. 758, vi. 187
'	,,	82	Caulinorum, Hk. J. V. 100, VI. 101
	. ,,		cirrhatum, Hk. f. v. 769, vi. 189 cirrhopetaloides, Griff v. 767
	,,	81	cirriopetatotaes, Grin v. 101
crispa, Benth	,,	81	clandestinum, Lindl. ▼ 753, vi. 187,
discolor, Roth		82	Olambai Babb 4 700
macrostachy Benth		81	Clarkei, Rohb. f v. 769
Martii, T. A. Schmidt		81	comosum, Coll. & Hemsl. ,, 762
Neemda, Ham	. ,,	82	conchiferum, Rchb. f. v. 766, vi. 188
nepalensis, Colia	,	81	concinnum, Hk. f vi. 187
panioulata, Wall	. ,,	81	confertum, Hk. f. v. 757, vi. 187
salicina, Lamk	. ,,	82	cornutum, Robb. f v. 774
serrulata. Roth	. ,,	82	orassifolium, Thw ,, 770
	,,	82	orassipes, Hk. f ,, 760
virgata, Blanco	,,	82	orassipes, Hk. f ,, 760 oupreum, Lind!. v. 761, vi. 188 cupreum, Hook v. 769
sp., Griff	,,	699	cupreum, Hook v. 760
Buettneria, Linn	. i.	376	oyunaraceum, Linai ,, 700
andamanensis, Kurz	. ,,	377	Dayanum, Rchb. f ,, 756-
aspera, Colehr	,,	377	elegans, Gard 770
7 10 71 997 11	,,	3 76	Etliæ, Rohb. f ,, 777 Epicrianthes, Hk. f ,, 753 eublepharum, Rchb. f ,, 764
T2717	,,	376	Epiorianthes, Hk. f ,, 753
	"	8 76	eublepharum, Rchb. f ,, 764
-111-11-11	"	877	fimbriatum, Rchb. f ,, 774
J. 6.12 DO	. ,,	377	fænisecii, Par. & R. f , 765
Lamba and Dank		376	fuscescens, Rohb. f ,, 712
hypoleuca, Turcz	·· ,,	378	fusco-purpureum, Wight ,, 760
T 1 1 117 11	,,	376	Globulus, Hk. f v. 767, vi. 189
	,,	377	gracile, Par. & R. f v. 762
	. "	377	grandiflorum, Griff ,, 769
	••	377	Griffithianum, Par. &
		376	Rohb. f ,, 774
		377	Griffithii, Rchb. f ,, 756
2 /* 327.11	•	377	auttulatum Wall 778
BUETTNERIEE	•	354	gymnopus, Hk. f. v. 764, vi. 188
Bulbillaria gageoides, Zuco			Henshalli, Lindl v. 755
Bulbophyl/opsis (Bolbophy			hirtum, Lindl ,, 762
lopsis) maculosa, Rchb.		776	hymenanthum, Hk. j. v. 767, vi. 188
Morphologorum, B. f.		776	imbricatum, Griff v. 765
Bulbophyllum, Thouars .			1
		770.	7 111 70 11 4
adenopetalum, Lindl	: 12	8 , 18 9	Whater Code 705
			khasyanum, Rohb. f ,, 765
affine, Lindl		756	Kingi Uk f - 780 - 199
albidum, Hk. f	,,	757 766	Kingii, Hk. f v. 760, vi. 188 lasianthum, Lindl v. 763
alcicorne, Par. & R. f.	,,	766	lasiochilum, Par. & Rehb.f., 772
alopecurum, Kcho. j	,,	770	
alopecurum, Rchb. f amplum, Rchb. f apodum, Hk. f v. 70	"	712	lemniscatum, Par ,, 762
a pod um, Hk . f $\forall 70$	DO, VI	. 188	leopardinum, Lindl, 756
auricomum, Lindl	▼.	765	leptanthum, Hk. f v. 759, 910,
bicolor, Rk. f	,,	770	vi. 188
bisetum, Lindl	,,	767	leptosepalum, Hk. f. v. 767, vi. 188
bootanense, Par. & R. f.	,,	775	limbatum, Lindl v. 763
candidum, Hk. f v. 7	70, ▼	i. 189	limbatum, Par. & Rohb. f. " 761
capillipes, Par. & R. f	v.	755	Lindlevanum, Griff 768
capitatum, Lindl	,,	759	Lobbii, Lindl v. 755, vi. 187

Indicate	Bulbophyllum Vol. Pa	ge Bulbophyilum	Vol. Pa	LØA
Macres, Rehb. f. v.	longipes, Robb. f v. 7	11 tremulum, Wight	v. 7	
Mannii, Rohb. f v. 780 Medusse, Rchb. f v. 780 Medusse, Rchb. f v. 751, vi. 187 megalanthum, Grif. v. 754, vi. 187 megalanthum, Grif. v. 754, vi. 187 megalanthum, Grif. v. 754, vi. 187 merguense, Par. & Rchb. f. v. 775 vi. 187 merguense, Par. & Rchb. f. v. 772 micranthum, Hk. f. v. 768, vi. 189 microtepalum, Rchb. f. v. 769 vi. 187 moniliforme, Par. & Rchb. f. v. 769 monodestum, Hk. f. v. 769, vi. 187 moniliforme, Par. & Rchb. f. v. 767 moniliforme, Par. & Rchb. f. v. 776 moniliforme, Par. & Rchb. f. v. 776 mantum, Rchb. f. v. 776 mantum, Rchb. f. v. 764 nilgherrense, Wight v. 764 nilgherrense, Wight v. 761 mantum, Rchb. f. v. 769 parviflorum, Par. & Rchb. f. v. 769 parviflorum, Par. & Rchb. f. v. 769 parviflorum, Par. & Rchb. f. v. 763 patens, King v. vi. 187 patense, King v. vi. 187 patense, King v. vi. 187 patense, King v. vi. 187 polyhizum, Lindl. v. 764 potiolare, Thu. v. 758, vi. 187 polyhizum, Lindl. v. 764 polyhizum, Lindl. v. 764 polyhizum, Lindl. v. 765 reptans, Lindl. v. 768 regiractum, Rchb. f. v. 765 soopbulbon, Par. & R. f. f. 761 Schmidtianum, Rchb. f. v. 765 siopobulbon, Par. & R. f. f. 761 stratellum, Rchb. f. v. 765 stratem, Rchb. f.	Macreei, Rchb. f vi. 1	90 tripudians, Par. & Rohl		79
Mannii, Rchb. f v. 780	macranthum, Lindl. v. 753, vi. 1	88 trisetosum, Griff,		53
megalanthum, Grif. v. 754, vi. 187 membranifolium, Hk f. v. 756, vi. 187 merguense, Par. & Rchb f. v. 777 mioranthum, Hk f. v. 769, vi. 189 miorotepalum, Rchb f. v. 769 miorotepalum, Rchb f. v. 769 mioliforme, Par. & Rchb f. v. 769 moniliforme, Par. & Rchb f. v. 769 moniliforme, Par. & Rchb f. v. 761 f muscicola, Rchb. f. 761 nasutum, Rchb f. 761 nasutum, Rchb f. 761 nolongum, Rchb f. 761 nolongum, Rchb f. 761 nolongum, Rchb f. 763 Rchb f. 763 Rchb f. 764 Rchb f. 764 Rchb f. 765 Rchb f. 765 Rchb f. 765 Rchb f. 766 parviforum, Par. & Rchb f. 775 pielacoum, Eath f. 775 pileatum, Lindl. 768 polythizum, Lindl. 768 polythizum, Lindl. 768 roficuratum, Rchb f. 775 pileatum, Lindl. 768 roficuratum, Rchb f. 775 Reinwardtii, Rchb f. 775 Sohmidtianum, Rchb f. 775 Sohmidtianum, Rchb f. 775 Sohmidtianum, Rchb f. 775 Sohmidtianum, Rchb f. 775 stane, Griff. 768 striatellum, Rchb f. 775 stane, Griff. 768 striatellum, Rchb f. 775 Spane, Griff. 768 striatellum, Rchb f. 7768 Sprun. 768 Sprun. 767	Mannii, Rchb. f v. 7	80 triste, Rchb. f		68
megalanthum, Grif. v. 754, vi. 187 membranifolium, Hk f. v. 756, vi. 187 merguense, Par. & Rchb f. v. 777 mioranthum, Hk f. v. 769, vi. 189 miorotepalum, Rchb f. v. 769 miorotepalum, Rchb f. v. 769 mioliforme, Par. & Rchb f. v. 769 moniliforme, Par. & Rchb f. v. 769 moniliforme, Par. & Rchb f. v. 761 f muscicola, Rchb. f. 761 nasutum, Rchb f. 761 nasutum, Rchb f. 761 nolongum, Rchb f. 761 nolongum, Rchb f. 761 nolongum, Rchb f. 763 Rchb f. 763 Rchb f. 764 Rchb f. 764 Rchb f. 765 Rchb f. 765 Rchb f. 765 Rchb f. 766 parviforum, Par. & Rchb f. 775 pielacoum, Eath f. 775 pileatum, Lindl. 768 polythizum, Lindl. 768 polythizum, Lindl. 768 roficuratum, Rchb f. 775 pileatum, Lindl. 768 roficuratum, Rchb f. 775 Reinwardtii, Rchb f. 775 Sohmidtianum, Rchb f. 775 Sohmidtianum, Rchb f. 775 Sohmidtianum, Rchb f. 775 Sohmidtianum, Rchb f. 775 stane, Griff. 768 striatellum, Rchb f. 775 stane, Griff. 768 striatellum, Rchb f. 775 Spane, Griff. 768 striatellum, Rchb f. 7768 Sprun. 768 Sprun. 767	Medusse, Rchb. f. v. 757, vi. 1	37 umbellatum, Lindl	,, 7	
membranifolium, Hk. f. v. 758, v. 187 merguense, Par. & Rchb. f. v. 772 micranthum, Hk. f. v. 768, v. 189 microtepalum, Rchb. f. v. 761 mishmeense, Hk. f. v. 769, v. 187 moniliforme, Par. & Rchb f. v. 757 f. moulmeinense, Rohb. f. , 751 f. moulmeinense, Rohb. f. , 751 f. moulmeinense, Rohb. f. , 754 nilgherrense, Wight , 761 nasutum, Rchb. f. , 754 nilgherrense, Wight , 761 nodoratissimum, Lindl. , 758 oligoglossum, Rchb. f. , 763 patens, King , v. 187 patens, King , 763 picturatum, Bchb. f. , 764 polythizum, Lindl. , 754 polythizum, Lindl. , 754 polythizum, Lindl. , 754 polythizum, Lindl. , 754 posittacoglossum, Rchb. f. , 775 protractum, Hk. f. v. 756, v. 187 protractum, Hk. f. v. 756, v. 187 protractum, Hk. f. v. 756, v. 187 protractum, Rchb. f. , 775 Reinwardti, Rchb. f. , 775 Schmidtianum, Rchb. f. v. 766 sabratum, Rchb. f. v. 765 sioyobulbon, Par. & R. f. , 755 sioyobulbon, Par. & R. f. , 755 sioyobulbon, Par. & R. f. , 755 statenellum, Rchb. f. v. 755 statenellum, Rchb. f. v. 755 state, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755 swave, Griff. , 768 striatellum, Rchb. f. v. 755	megalanthum, Griff. v. 754, vi. 1	87 uniflorum, Griff	,, 7	
merguense, Par. & Rchb. f. v. 772 micranthum, Hk. f. v. 768, v. 189 microtepalum, Rchb. f. v. 761 mishmeense, Hk. f , 769 mondistrum, Hk. f. v. 769, v. 187 monolliforme, Par. & Rchb f. v. 757 f. moulmeinense, Rchb. f , 754 nasutum, Rchb. f , 754 nilgherrense, Wight , 761 nasutum, Rchb. f , 761 nollingerrense, Wight , 762 nollingerrense, Wight , 763 nollingerrense, Wight , 768 nollingerrense, Rehb. f , 769 nollingerrense, Rehb. f.			,, 7	
micranthum, Hk. f. v. 768, v. 189 microtepalum, Rchb. f. v. 761 mishmeense, Hk. f. v. 769, v. 187 moniliforme, Par. & Rchb f. v. 757 moulmeinense, Rohb. f. v. 758 moniliforme, Par. & Rchb f. v. 757 moulmeinense, Rohb. f. 776 nasutum, Rchb. f. 778 oligoglossum, Rchl. f. 778 oligoglossum, Rchl. f. 778 oligoglossum, Rchl. f. 778 pareinens, King vi 187 patens, King vi 187 Penicillium, Par. & Rchb. f. 779 pictum, Par. & Rchb. f. 775 pileatum, Lindl. 7754 polythisum, Lindl. 7754 polythisum, Lindl. 7754 polythisum, Lindl. 7754 protractum, Hk. f. v. 758, vi 187 psittacoglossum, Rchb. f. 777 pripureum, Thu. 778 radiatum, Lindl. 776 repens, Griff. 776 repens, Griff. 776 Reinwardtii, Rchb. f. 774 ruflabrum, Rchb. f. 775 Schmidtianum, Rchb. f. 775 Schmidtianum, Rchb. f. 776 sicyobulbon, Par. & R. f. 761 striatallum, Rchb. f. 7775 striatatilum, Rchb. f. 7765 suave, Griff. 768 suavissimum, Rolfe 768 Sprun. 676 Sprun. 676		;		
microtepalum, Rchb. f v. 761 mishmeense, Hk. f				
mishmeense, Hk. f			,, -	
mondestum, #k. f. v. 759, vi. 187 moulmeinense, Rohb f. v. 755 moulmeinense, Rohb. f, 768 muscicola, Robb. f, 776 nasutum, Rchb. f, 768 nasutum, Rchb. f, 769 nasutum, Rchb. f, 767 nasutum, Rchb. f, 768		Wightii, Robb. f	, 7	
moniliforme, Par. & Rehb f. v. 757 moulmeinense, Rehb. f, 781 muscicola, Rehb. f, 754 nilgherrense, Wight, 754 nilgherrense, Wight, 755 oldonaum, Rehb. f, 758 oldonaum, Rehb. f, 758 oldonaum, Rehb. f, 758 oldonaum, Rehb. f, 758 paleaceum, Benth, 769 parviflorum, Par. & Rehb. f, 763 Penicillium, Par. & Rehb. f, 755 Reinwardtii, Rehb. f, 755 Reinwardtii, Rehb. f, 755 Reinwardtii, Rehb. f, 755 Reinwardtii, Rehb. f, 758 repens, Griff, 765 repens, Griff, 765 regens, Lindl, 765 regens, Rehb. f, 775 regens, Rehb. f, 77		$\mathbf{Wra}_{i}, Hk, f, \dots \mathbf{v}_{i}$	766, v 1. 1	
	modestum, Frk. J. V. 759, VI. 1	xylophyllum, Par. & Rel	10.j. ▼ . 7	90
### ### ### ### ### ### ### ### ### ##	O I Dakk P	8p., Grin v. v. v	on, 704, 7	07
nilgherrense, Wight , 780 oblongum, Rohb. f. , 780 odoratissimum, Lindl. , 758 paleaceum, Benth. , 769 parviflorum, Par. & Rehb. f. , 763 patens, King , 763 patens, King , 763 petiolare, Thw. , 764 petiolare, Thw. , 759 pictum, Par. & Rohb. f. , 775 dicturatum, Rohb. f. , 775 pileatum, Lindl. , 754 polyrhizum, Lindl. , 754 polyrhizum, Lindl. , 754 postractum, Rehb. f. , 775 pietatum, Rehb. f. , 775 pietatum, Lindl. , 767 protractum, Hk. f. v. 758, vi psittacoglossum, Rehb. f. , 771 prictum, Rohb. f. , 775 keinwardti; Rehb. f. , 776 Reinwardti; Rehb. f. , 779 Reinwardti; Rehb. f. , 768 prufnum, Rohb. f. , 768 prufnum, Rohb. f. , 775 Schmidtianum, Rehb. f. , 776 sicyobulbon, Par. & R. f. , 775 striatum, Rehb. f. ,	A Dath A M	51 Buildostylls, Aunth	VI. 0	
nilgherrense, Wight , 780 oblongum, Rohb. f. , 780 odoratissimum, Lindl. , 758 paleaceum, Benth. , 769 parviflorum, Par. & Rehb. f. , 763 patens, King , 763 patens, King , 763 petiolare, Thw. , 764 petiolare, Thw. , 759 pictum, Par. & Rohb. f. , 775 dicturatum, Rohb. f. , 775 pileatum, Lindl. , 754 polyrhizum, Lindl. , 754 polyrhizum, Lindl. , 754 postractum, Rehb. f. , 775 pietatum, Rehb. f. , 775 pietatum, Lindl. , 767 protractum, Hk. f. v. 758, vi psittacoglossum, Rehb. f. , 771 prictum, Rohb. f. , 775 keinwardti; Rehb. f. , 776 Reinwardti; Rehb. f. , 779 Reinwardti; Rehb. f. , 768 prufnum, Rohb. f. , 768 prufnum, Rohb. f. , 775 Schmidtianum, Rehb. f. , 776 sicyobulbon, Par. & R. f. , 775 striatum, Rehb. f. ,		Darbata, Aunth	,, 0	
Subspinescens, Clarke	_:1_b	Si capillaris, Aunth	,, 0	
Subspinescens, Clarke		or makernla Kunth	,, 0	=
Subspinescens, Clarke	-34ii [i] 7	58 pulchalla Thur	,, 6	
paleaceum, Benth , 769 parviflorum, Par. \$, 763 Rchb. f , 763 patens, King , vi. 187 Penicillium, Par. \$ Rchb. f , 764 peticlare, Thw , 759 pileatum, Par. & Rchb. f , 775 pileatum, Lindl , 754 polyrhizum, Lindl , 767 polyrhizum, Lindl , 767 polyrhizum, Lindl , 767 postatoglossum, Rchb. f , 771 parpureum, Thw , 758 radiatum, Lindl , 754 purpureum, Thw , 758 radiatum, Lindl , 758 radiatum, Lindl , 758 radiatum, Lindl , 758 repractum, Rchb. f , 771 purpureum, Thw , 758 refractum, Rchb. f , 779 Reinwardtii, Rchb. f , 779 Reinwardtii, Rchb. f , 764 repens, Griff , 768 rufinum, Rchb. f , 768 rufinum, Rchb. f , 768 rufinum, Rchb. f , 768 siamense, Rchb. f , 775 Schmidtianum, Rchb. f , 775 siave, Griff , 775 siave, Griff , 775 striatum, Rchb. f , 775 striatum, Rchb. f , 775 suave, Griff , 765 suave, Griff , 768 suave, Griff , 76	Maria Dell C	71 subspinessens Clarks	,, 6	
Rchb. f				
Rchb. f	partiforum Par. S	1. 3.1	,, ,	
Penicillium, Par. & Rchb. f. v. 764 Penicillium, Par. & Rchb. f. v. 765 Penicillium, Par. & Rchb. f. v. 765 Penicillium, Par. & Rchb. f. v. 775 Penicillium, Rchb. f. v. 775 Penicillium, Rchb. f. v. 775 Penicillium, Lindl. v. 767 Penicillium, Lindl. v. 767 Penicillium, Lindl. v. 768 Penicillium, Rchb. f. v. 758, vi. 187 Penicillium, Rchb. f. v. 758, vi. 187 Penicillium, Rchb. f. v. 758 Penicillium, Rchb. f. v. 768 Penicillium, Rchb. f. v. 766 Penicillium, Rchb. f. v. 765 Penicillium, Rchb. f	Rehb. f 7			
Penicillium, Par. & Rchb. f. v. 764 pettolare, Thw	patens, King vi. 1	1		
Detiolare, Thw	Penicillium, Par. & Relib. f v. 7		c	
picturalum, Par. & Rohb. f, 781 picturatum, Rohb. f, 775 pileatum, Lindl, 754 polyrhizum, Lindl, 767 paittacoglossum, Rchb. f. v. 758, vi. 187 partractum, Hk. f. v. 758, vi. 187 partractum, Rchb. f, 771 purpureum, Thw, 768 radiatum, Lindl, 768 radiatum, Lindl, 768 radiatum, Lindl, 768 refractum, Rchb. f, 779 Reinwardtii, Rchb. f, 765 reptans, Lindl, 768 reptans, Lindl, 768 rotundatum, Rchb. f, 765 reptans, Lindl, 768 rotundatum, Rchb. f, 767 rufinum, Rchb. f, 761 rufinum, Rchb. f, 761 rufinum, Rchb. f, 761 scabratum, Rchb. f, 771 sceundum, Hk. f. v. 764, vi. 188 siamense, Rohb. f, 775 sioyobulbon, Par. & R. f, 765 sioyobulbon, Par. & R. f, 765 striatellum, Ridl, 762 suavyssimum, Rohb. f, 763 striatellum, Ridl, 765 suave, Griff, 762 suavyssimum, Rolse, 768 sprun, 678 sprun, 678 sprun, 676 sioyobulbon, Rolse, 765 sprun, 676 sprun				
picturatum, Rebb. f	Total Dam & Date #		Q	76
pileatum, Lindl , 754 polythizum, Lindl , 767 protractum, Hk. f. v. 758, vi. 187 paittacoglossum, Rchb. f. v. 754 purpureum, Thw , 768 radiatum, Lindl , 768 refractum, Rchb. f , 779 Reinwardtii, Rchb. f , 779 Reinwardtii, Rchb. f , 765 reptans, Lindl , 765 reptans, Lindl , 765 rotundatum, Rchb. f , 765 rufinum, Rchb. f , 774 rufinum, Rchb. f , 774 rufinum, Rchb. f , 774 rufinum, Rchb. f , 775 Sohmidtianum, Rchb. f , 775 Sohmidtianum, Rchb. f , 775 sioyobulbon, Par. & R. f , 756 sicyobulbon, Par. & R. f , 758 striatellum, Ridl , 762 suavyssimum, Rchb. f , 765 suave, Griff , 762 suavyssimum, Rolfe , 765 suavyssimum, Rolfe , 765 spanvissimum, Rolfe , 768 sprun , 878 canavissimum, Rolfe , 768 sprun , 878 canavissimum, Rolfe , 768 sprun , 878	Total construction Dalph & 17		4	77
polyrhizum, Lindl, 767 protractum, Hk. f. v. 758, vi. 187 psittacoglossum, Rchb. f. v. 754 Psychoon, Rchb. f, 771 purpureum, Thw, 768 radiatum, Lindl, 758 Reinwardti, Rchb. f, 779 Reinwardti, Rchb. f, 765 reptans, Lindl, 768 reptans, Lindl, 768 rotundatum, Rchb. f, 765 rotundatum, Rchb. f, 765 rufinum, Rchb. f, 774 Roxburghii, Rchb. f, 761 rufinum, Rchb. f, 761 rufinum, Rchb. f, 761 rufinum, Rchb. f, 775 Schmidtianum, Rchb. f, 775 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f, 775 sillenianum, Rchb. f, 775 sillenianum, Rchb. f, 775 sillenianum, Rchb. f, 765 striatellum, Ridl, 762 suavissimum, Rchb. f, 765 suave, Griff, 765 suave, Griff, 765 suavesimum, Role, 768 sprun, 676 sprun,				75
paittacoglossum, Rchb. f. v. 754 Psychoon, Rchb. f, 771 purpureum, Thw, 768 radiatum, Lindl, 758 refractum, Rchb. f, 779 Reinwardtii, Rchb. f, 765 reptans, Lindl, 768 rotundatum, Rchb. f, 765 rotundatum, Rchb. f, 768 rufinum, Rchb. f, 768 rufinum, Rchb. f, 761 rufinum, Rchb. f, 761 rufinum, Rchb. f, 766 rufinum, Rchb. f, 766 rufinum, Rchb. f, 766 scabratum, Rchb. f, 771 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f, 775 sioyobulbon, Par. & R. f, 761 sillenianum, Rchb. f, 775 sitenobulbon, Par. & R. f, 765 striatellum, Ridl, 762 suav, Griff, 762 suav, Griff, 762 suavissimum, Rolse, 762 suavissimum, Rolse, 762 suavissimum, Rolse, 763 sprun, 878 sprun, 878 sprun, 676 heterophyllum, Jacquem, 676 himalensis, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 675 himalensis, Klotz, 677 hoffmeisteri, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 675 himalensis, Klotz, 677 hoffmeisteri, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 675 himalensis, Klotz, 677 hoffmeisteri, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 676 jucundum, Kurz, 675 maricolum, A. Kerner, 676 jucundum, Kurz, 675 maricolum, A. Kerner, 676 jucundum, Kurz, 675 himalensis, Klotz, 676 hima	polyrhizum, Lindl ,, 7	67 Candollii, Wall	,, 6	74
paittacoglossum, Rchb. f. v. 754 Psychoon, Rchb. f, 771 purpureum, Thw, 768 radiatum, Lindl, 758 refractum, Rchb. f, 779 Reinwardtii, Rchb. f, 765 reptans, Lindl, 768 rotundatum, Rchb. f, 765 rotundatum, Rchb. f, 768 rufinum, Rchb. f, 768 rufinum, Rchb. f, 761 rufinum, Rchb. f, 761 rufinum, Rchb. f, 766 rufinum, Rchb. f, 766 rufinum, Rchb. f, 766 scabratum, Rchb. f, 771 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f, 775 sioyobulbon, Par. & R. f, 761 sillenianum, Rchb. f, 775 sitenobulbon, Par. & R. f, 765 striatellum, Ridl, 762 suav, Griff, 762 suav, Griff, 762 suavissimum, Rolse, 762 suavissimum, Rolse, 762 suavissimum, Rolse, 763 sprun, 878 sprun, 878 sprun, 676 heterophyllum, Jacquem, 676 himalensis, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 675 himalensis, Klotz, 677 hoffmeisteri, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 675 himalensis, Klotz, 677 hoffmeisteri, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 675 himalensis, Klotz, 677 hoffmeisteri, Klotz, 677 hoffmeisteri, Klotz, 676 jucundum, Kurz, 676 jucundum, Kurz, 675 maricolum, A. Kerner, 676 jucundum, Kurz, 675 maricolum, A. Kerner, 676 jucundum, Kurz, 675 himalensis, Klotz, 676 hima	protractum, Hk. f. v. 758, vi. 19	falcatum, Linn	,, 6	76
Psychoon, Rchb. f	psittacoglossum, Rchb. f. v. 7	64 flexuosum, Wall		
radiatum, Lindl. , 758 himalensis, Klotz. , 676 refractum, Rebb. f. , 779 Hoffmeisteri, Klotz. , 676 Reinwardti, Rebb. f. , 768 imaicolum, A. Kerner , 676 repens, Griff. , 768 jucundum, A. Kerner , 675 reptans, Lindl. , 768 lauceolatum, Wall. , 675 reptans, Lindl. , 768 lauceolatum, Wall. , 675 rotundatum, Rebb. f. , 774 Maddeni, Clarke , 676 rufinum, Rebb. f. v. 761 muroinatum, Wall. , 676 rufinum, Rebb. f. v. 765 nervosum, Moon , 676 scabratum, Rebb. f. v. 764 vi. 188 nigrocarpum, Jacquem. , 676 scabratum, Rebb. f. v. 765 polyphyllum, Ledeb. , 676 siamense, Rohb. f. v. 765 ramensissimum, W. & A. , 676 sioyobulbon, Par. § R. f. v. 755 sectaceum, Fenzl , 677 striatellum, Ridl. vi. 189 setaceum, Fenzl , 678 striatellum, Rohfe v. 755 setaceum, Fenzl , 675 suavissimum, Rolfe , 762		gracillimum, Klotz.	••	
refractum, Rchb. f , 779 Reinwardtii, Rchb. f , 754 repens, Griff , 765 reptans, Lindl , 768 rotundatum, Rchb. f. , 712 Rosburghii, Rchb. f. , 774 rufilabrum, Par. , 761 rufinum, Rchb. f , 766 rufinum, Rchb. f , 776 Schmidtianum, Rchb. f. , 777 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f. , 775 sioyobulbon, Par. & R. f. , 761 Sillenianum, Rchb. f. , 775 striatellum, Ridl. , v. 758 striatellum, Ridl. , v. 768 suavyissimum, Rolfe , 762 suavyissimum, Rolfe , 768 Hoffmeisteri, Klotz , 676 imaicolum, A. Kerner , 676 imaicolum, A. Kerner , 675 jucundum, Kurz , 675 macicolum, A. Kerner , 676 jucundum, Kurz , 675 macicolum, A. Kerner , 676 jucundum, Kurz , 675 macicolum, A. Kerner , 676 jucundum, Kurz , 675 macicolum, A. Kerner , 676 jucundum, Kurz , 675 macicolum, A. Kerner , 676 jucundum, Kurz , 675 macicolum, A. Kerner , 676 jucundum, Kurz , 675 macicolum, A. Kerner , 676 jucundum, Kurz , 675 macicolum, A. Kerner , 675 jucundum, Kurz , 675 macicolum, A. Kerner , 675 jucundum, Kurz , 675 macicolum, A. Kerner , 675 jucundum, Kurz , 675 macicolum, A. Kerner , 675 macicolum, A. Kerner , 675 jucundum, Kurz , 675 macicolum, A. Kerner , 675 jucundum, Vall , 675 macicolum, A. Kerner , 675 jucundum, Vall , 675 jucundu				
Reinwardtii, Rchb. f. ,, 754 imaicolum, A. Kerner ,, 676 repens, Griff. ,, 768 jucundum, Kurz ,, 675 reptans, Lindl. ,, 768 lanceolatum, Wall. ,, 674 rotundatum, Rchb. f. ,, 712 longicaule, Wall. ,, 677 Roxburghii, Rchb. f. ,, 761 Maddeai, Clarke ,, 678 rufinum, Rchb. f. v. 188 mucronatum, Wall. ,, 676 rufinum, Rchb. f. v. 766 nervosum, Moon ,, 676 scabratum, Rchb. f. ,, 771 plantaginifolium, Wight ,, 674 secundum, Hk. f. v. 764, vi. 188 polyphyllum, Ledeb. ,, 675 siamense, Rchb. f. v. 761 rupestre, Edgew ,, 675 Sillenianum, Rchb. f. v. 771, vi. 189 setaceum, Fenzl ,, 675 striatellum, Ridl. vi. 189 setaceum, Fenzl ,, 675 striatellum, Rchb. f. v. 755 setaceum, Fenzl ,, 675 suavissimum, Rolfe ,, 762 setaceum, Fenzl ,, 675 sprun ,, 676 rupestre, Edgew ,, 675 setaceum, Fenzl ,, 675 rupestre, E	radiatum, Lindl ,, 7			
repens, Griff , 765 reptans, Lindl , 768 rotundatum, Rchb. f. , 712 Roxburghii, Rehb. f. , 774 rufinum, Par. , 761 rufinum, Rchb. f. , 774 rufinum, Rchb. f. , 774 rufinum, Rchb. f. , 775 Schmidtianum, Rchb. f. , 775 siawense, Rchb. f. , 765 sicyobulbon, Par. & R. f. , 765 sicyobulbon, Par. & R. f. , 765 striatellum, Ridl. , 765 suave, Griff , 762 suavissimum, Rolfe , 762 suavissimum, Rolfe , 768 supplies in the first of			,,	
reptans, Lindl			"	
rotundatum, Rchb. f. , , 712 Rosburghti, Rchb. f. , , 774 rufilabrum, Par. , , 761 rufinum, Rchb. f. , vi. 188 rufinum, Rchb. f. , v. 766 scabratum, Rchb. f. , , 775 Schmidtianum, Rchb. f. , , 775 siamense, Rchb. f. , v. 764, vi. 188 siamense, Rchb. f. , v. 765 sioyobulbon, Par. & R. f. , 761 Sillenianum, Rchb. f. v. 771, vi. 189 striatellum, Ridl. , vi. 189 str			"	
Roxburghii, Rehb. f. ", 774 rufilabrum, Par. ", 761 rufinum, Rchb. f. vi. 188 rufinum, Rchb. f. v. 766 scabratum, Rchb. f. ", 775 Schmidtianum, Rchb. f. ", 771 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f. v. 764, vi. 188 sioyobulbon, Par. & R. f. ", 761 Sillenianum, Rchb. f. v. 771, vi. 189 stenobulbon, Par. & R. f. ", 761 striatellum, Ridl. vi. 189 striatum, Rchb. f. v. 755 suave, Griff. ", 762 suavissimum, Rolfe ", 768			,,	
rufilabrum, Par. , 761 rufinum, Rchb. f. vi. 188 rufinum, Rchb. f. v. 766 scabratum, Rchb. f. , 775 Schmidtianum, Rchb. f. , 771 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f. v. 765 silenianum, Rchb. f. v. 771 Sillenianum, Rchb. f. v. 771 stenobulbon, Par. & R. f. v. 778 striatellum, Ridl. vi. 189 striatum, Rchb. f. v. 755 suave, Griff. v. 762 suavissimum, Rolfe 768				
rufinum, Rchb. f. v. 766 mucronatum, W. & A. ,, 676 scabratum, Rchb. f. v. 764 nervosum, Moon ,, 676 Schmidtianum, Rchb. f. v. 764, vi. 188 plantaginifolium, Wight , 674 secundum, Hk. f. v. 764, vi. 188 polyphyllum, Ledeb , 675 siamense, Rchb. f. v. 755 ramesissimum, W. & A. , 676 sioyobulbon, Par. & R. f. v. 755 rupestre, Edgew , 675 stenobulbon, Par. & R. f. v. 758 setaceum, Fenzl , 678 striatellum, Ridl. v. 755 setaceum, John , 675 suave, Griff. v. 762 rupestre, Edgew , 676 Thomsoni, Clarke , 675 rupestre, Edgew , 676 striatellum, Ridl. v. 755 setaceum, Fenzl , 678 suavissimum, Rolfe 762 sprun. 678	maleham Par	31 managinatum Well		
Schmidtianum, Rchb. f, 771 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f v. 755 sioyobulbon, Par. § R. f. , 761 Sillenianum, Rchb. f. v. 771, vi. 189 stenobulbon, Par. § R. f. v. 758 striatellum, Ridl vi. 189 striatum, Rchb. f v. 755 suave, Griff v. 762 suavissimum, Rolfe 768 Sprun 678	wasaam Robb f wi 1		" "	
Schmidtianum, Rchb. f, 771 secundum, Hk. f. v. 764, vi. 188 siamense, Rchb. f v. 755 sioyobulbon, Par. § R. f. , 761 Sillenianum, Rchb. f. v. 771, vi. 189 stenobulbon, Par. § R. f. v. 758 striatellum, Ridl vi. 189 striatum, Rchb. f v. 755 suave, Griff v. 762 suavissimum, Rolfe 768 Sprun 678	enfrom Robb f		" a	
Schmidtianum, Rchb. f. ,, 771 secundum, Hk. f. v. 764, vi. 188 polyphyllum, Ledeb. ,, 675 siamense, Rchb. f. v. 755 ramosissimum, W. & A. ,, 676 Sillenianum, Rchb. f. v. 771, vi. 189 sachalinense, F. Schmidt ,, 675 striatellum, Ridl. v. 758 setaceum, Fenzl ,, 675 striattm, Rchb. f. v. 762 setaceum, Fenzl ,, 675 suave, Griff. ,, 762 rungstre, Edgew. ,, 675 striatellum, Ridl. v. 765 tenue, D. Don ,, 675 Thomsoni, Clarke ,, 675 trichopodum, Boiss. & Sprun 678				
secundum, Hk. f. v. 764, vi. 188 polyphyllum, Ledeb. " 675 siamense, Rohb. f. v. 755 ramosissimum, W. & A. " 676 sicyobulbon, Par. & R. f. v. 771, vi. 189 sachalinense, F. Schmidt " 675 stenobulbon, Par. & R. f. v. 758 setaceum, Fenzl " 678 striatellum, Ridl. v. 755 setaceum, Fenzl " 677 striatum, Rchb. f. v. 755 tenue, D. Don " 677 Thomsoni, Clarke " 675 suavissimum, Rolfe " 768 Sprun 678			-14 0	
siamense, Rohb. f. v. 755 ramosissimum, W. & A. , 676 sioyobulbon, Par. § R. f. , 761 rupesire, Edgew. , 675 sillenianum, Rchb. f. v. 771, vi. 189 sachalinense, F. Schmidt. , 675 striatellum, Ridl. v. 755 setaceum, Fenzl. , 678 striatum, Rchb. f. v. 755 tenue, D. Don. , 677 Thomsoni, Clarke. , 675 suavissimum, Rolfe. , 762 trichopodum, Boiss. & Sprun. 678		88 polyphyllum, Ledeb.	6	
sicyobulbon, Par. & R. f. ,761 Sillenianum, Rchb.f. v. 771, vi. 189 atenobulbon, Par. & R. f. v. striatellum, Ridl. vi. striatenn, Rchb.f. v. suave, Griff. ,762 anavissimum, Rolfe ,768 rupestre, Edgew. ,675 setaceum, Fenzl ,675 tenue, D. Don ,675 trichopodum, Boiss. & Sprun. ,678	siamense Robb. f. v. 7			
Sillenianum, Rchb. f. v. 771, vi. 189 sachalinense, F. Schmidt, 675 stenobulbon, Par. & R. f. v. 758 setaceum, Fenzl, 678 striatellum, Ridl vi. 189 tenue, D. Don, 677 striatenm, Rchb. f v. 755 Thomsoni, Clarke, 675 suave, Griff 768 Sprun 678	sicyobulbon, Par. & R. f 70			
stenobulbon, Par. & R. f. v. 758 setaceum, Fenzl , 678 striatellum, Ridl vi. 189 tenue, D. Don , 677 striatam, Rchb. f v. 755 Thomsoni, Clarke , 675 suave, Griff 762 trichopodum, Boiss. & Sprun 678	Sillenianum, Rchb. f. v. 771. vi. 1			
striatellum, Ridl. vi. 189 tenue, D. Don , 677 striatum, Rchb. f. v. 755 Thomsoni, Clarke , 675 suave, Griff. , 762 trichopodum, Boiss. & & suavissimum, Rolfe 768 Sprun 678		8 setaceum, Fenzl	,, 6'	• •
striatum, Rchb. f v. 755 Thomsoni, Clarks , 675 suave, Griff , 762 trichopodum, Boiss. & Sprun 678		tenue, D. Don	, 6	
suave, Griff , 762 trichopodum, Boiss. & Sprun 678	striatum, Rchb. f v. 78	Thomsoni, Clarke	43	
suavissimum, Rolfe ,, 768 Sprun ,, 678 Thomsoni, Hk. f. v. 764, vi. 188 virgatum, W. & A ,, 676	suave, Griff , 76	32 trichopodum, Boiss. d	t	
Thomsoni, Hk. f. v. 784, vi. 188 virgatum, W. & A , 676	suavissimum, Rolfe ,, 76	84 Sprun	,, 6	78
	Thomsoni, Hk. f. v. 764, vi. 18	8 virgatum, W. & A	,, 6	76

Danis		_	_	I That a face	
Baplearum			Page	Butonica Vol. P	
virgatum, Wall		١.	676		507
sp., Hk. f. & T		•	678	D 71	240
Edrmannia, Linn:	-	7.	664 664	1	B67
azurea, Griff	•	,	665	,,	266
bifurca, Herb. Ham	• :	,	665	, , , , , , , , , , , , , , , , , , , ,	267
candida, Griff	•	,	665	, , , , , , , , , , , , , , , , , , , ,	267
Championii, Thw	• ;	,	666		267
colestis, D. Don	. ,	,	665		266
distachya, Br	. ;	,	664		267
distioba, Linn		,	664		267
javanica, Bl	. ,	,	665	sp., Wall ,	267
longifolia, Becc	. ,	,	664	Byrsophyllum, Hk. f iii.	107
nepalensis, Hk. f		,	666	ellipticum, Hk . f , ,,	107
Pseudo-alata, Champ		,	666		107
pusilla, Thw		,	665	Bystropogon (Bysteropogon)	
sumatrana, Miq		,	664		681
triflora, Roxb		,	665		630
unistora, Herb. Rottl		,	665		286
Wallichii, Hk. f			666	1-31-mm 171. f	286
O100		,,	666	10010um, <i>IIk. J.</i> ,,	
		"	664	Савомвеж i,	113
			530	A 11 1 177 13 111	384
Bursera, Linn			530	Cacalia angulosa, Wall 111.	836
				augustiaes Wall	
BURSEBACE E		•	527	aurantiaca, Wall ,,	333
Bursinopetalum arboreum			MAR		835
Wight	. 1	i.	745		834
tetrandum, Wight		,	745	, , , , , , , , , , , , , , , , , , , ,	334
Busea decurrens, Miq	. 1	V.	370		336
_ subsessilis, Miq		,	870		338
Butea, Rowb	. i	i.	194	, , , , , , , , , , , , , , , , , , , ,	834
acuminata, Wall		,,	194	cylindriftora, Wall ,,	335
frondosa, Rogb	. ,	,	194	Finlaysoniana, Wall ,,	835
frondosa, Wall	•	,	195	flava, Ham ,,	833
gyrocarpa, Wall	. ,	,	193	fætens, Wall ,,	333
minor, Ham		,,	195		336
parviflora, Roxb		,	193		838
sericophylla, Wall		,	193		337
superba, Rowb		,,	195		353
Buterwa rhamnifolia, Nees		Ÿ.	438		335
ulmifolia, Nees			430		333
Butinia capnoides, Done		i.	691	Wainin Croh	337
libanotica, Boiss			673		387
BUTOMER		i.	559	Incininta Wall	334
Butomopsis, Kunth		i.	562		336
1 77 41			562	min makisida Doma	83 1
6 T . 1 A T		•	562	377-11	335
7		i.	562	77 A T T T T T T T T T T T T T T T T T T	885
		*	562	1 1:6.2: 107:11.3	234
Dobia, Ham		,	562		234 334
lanceolatus, Roxb		,	562	1	336
latifolius, D. Don)		,	
umbellatus, Linn	<u>'</u> و	?	562	,	352
Butonica, Juss	. 1	i.	507		366
alata, Miers		1	508		403
			508		386
ceylanica, Miers	. i	i.	508	,	851
inclyta, Miers	• ;	,	507		852
racemosa, Miers	• ;	,,	507	sp., Burm ,,	28 8

		17-1	D	! #=1	D
Cacoucia lucida, Hassk.		voı. ii.	Page 454	CESALPINIEE ii.	Page 60
A	•••		454		
	•••	iï.	657	amillania Dank	901
Cactus indicus, Roxb	•••		657		
	•••	ii.	172	Caidbeja adherens, Forsk V	
Cadaba, Forsk	•••	i.	173	Cajanus, DC ii	215
dubia, DC	•••	"		albicans, Grah ,,	217
farinosa, Forsk	•••	"	178	bicolor, DC ,,	217
heterotricha, Stocks	•••	"	173	bicolor, Wall ,,	222
indica, Lamk	•••	"	172	candicans, Wall ,,	
trifoliata, W. & A	•••	"	172	flavus, DC ,,	217
triphylla, Wight	•••	,"	172	glandulosus, Dals. & Gibs. "	218
Cadamba jasministora, Son			126	goensis, Dalz ,,	216
Casalpinia, Linn	•••	ii.	254	indicus, Spreng ,,	217
arborea, Miq	•••	"	257	kuinensis, Dalz ,,	214
armata, Grah	•••	"	256	lineatus, Grah ,,	213
? axillaris, DO	•••	"	258	nervosus, Royle ,,	216
bijuga, Wall	•••	"	255	niveus, Grah ,,	214
Bonduc, Roxb	•••	,,	255	scarabæoides, Thou ,,	215
Bonducells, Fleming	•••	"	254	suaveolens, Grah ,,	222
cinclidocarpa, Miq	•••	"	256	Wightianus, Grah,	215
Crista, Thunb	•••	,,	256	CAKILINEÆ i. i.	130
cucullata, Roxb	•••	,,	258	Calacanthus, T. Anders iv.	
dasyrachis, Miq	•••	,,	257	Dalzellians, T Anders ,.	478
digyna, Rottl	•••	"	256	Caladium acre, Br vi	523
elata, Schwartz		"	260	amboinense, Ham ,,	533
enneaphylla, Roxb		,,	258	cucullatum, Pers "	525
ferox, Hassk	•••	"	256	discretum, Ham "	519
ferox, Hohen		"	261	esculentum, Vent ,,	523
ferruginea, Miq		"	257	glycirrhizum, Fraser "	526
Finlaysoniana, Grah.			257	Laterankeller Drost	527
flavicans, Grab		"	256	macrorrhizon, Br ,,	526
C C		••	253	mandanum Harra	495
Glenieii, Thw	•••	. "	257	I Want	523
	•••	٠,	256	l alamaticalment O Tack	526
gracilis, Miq grandis, Heyne	•••	"	258		526
2		"	256	2 matum Ham	519
hymenocarpa, Wall	•••	"	259		495
		"	257	manustrum D Dam	522
japonica, Sieb. & Zucc.	•••	"	256	minimum Todd	522
7 Da-h	•••	"	259	Calamagrostis, Adans vii:	
	•••	"	257	ammalinassa Dath	266
	•••	"	256		268
1 YT	•••	,,	261	allines Clauma	264
37 4 /4	•••	"	255		221
Nuga, Ait oleosperma, Roxb	•••	"	256	colorata, DC ,, debilis, Hk . f ,,	262
	•••	"	255	debilie, Hk . f ,,	260
paniculata, Roxb	•••	,,	255	decora, Hk $f.$,, emodensis, $Griseb.$,,	261
pulcherrima, Sw	•••	"	256	Palasias Dath	260
resupinata, Boxb	•••	"	255		268
Sappan, Linn	•••	"	255	fliformis, Griseb "	260
scandens, Kosn	••••	"	-	georgica, C. Koch ,,	
sepiaria, Roxb	•••	"	256	glauca, Rohb vii. 260	,
	•••	"	258	glomerata, Boiss. & Bühse vii.	260 263
	•••	"	256	Griffithians, Hk. f ,,	
sumatrana, Roxb	•••	99	259	holciformi, J. & S ,,	267 265
sumatrana, Wall	•••	**	255	Hookerians, Steud ,,	260
tortuosa, Rosb	•••	99	257	Huebneriana, Rohb ,,	
tortuosa, Wall	•••	"	257	Jacquemontii, Hk. f "	265

Calumagrostis	Vol.		Calamus	•	Vol. I	
Lagurus, Koel	vii.	106	delicatulus, Thw	•••	vi.	446
lanceolata, Aitch	"	261	densifiorus, Becc	••	"	445
lanceolata, Stokes	"	26 0	Diepenhorstii, Miq.		,,	454
lawa, Host	"	261	diffusus, Becc	•••	,,	447
lithuanica, Schult	"	260	digitatus, Becc		"	442
littorea, $\dot{D}C$,,	261	Dorinei, Becc		,,	456
Munrosna, Boiss	,,·	263	Draco, Griff		17	467
mepalensis, Nees	"	261	erectus, Roxb		19	438
nepalensis, Str. & Wint	"	261	exilis, <i>Ġriff</i>		"	154
pilosula, Hk. f	"	263	extensus, Mart		,,	444
pulchella, Hk. f	"	268	extensus, Roxb		,,	462
pyramidalis, Host		266	fasciculatus, Roxb	•••	,,	444
	"	260			"	448
.	**	265	Feanus, Beco Fernandezii, H. Wendl			459
701.2 (1	"	265	filipendulus, Becc	• • • • •	"	443
	77	267			"	439
scabrescens, Griseb	"	264	Flagellum, Griff Flagellum, T. Anders.	•••	"	463
Schmidii, Hk. f	**			•••	"	444
Stolizkai, Hk. f	"	262	floribundus, Griff	•••	"	
sylvatica, DC	"	266	Gamblei, Becc	•••	٠,,	453
tartarica, Jacquem	"	262	geministorus, Griff	•••	17	479
thyrsoides, C. Koch	"	260	geniculatus, Griff	•••	,,	470
tripilifera, Hk. f	"	262	giganteus, Becc	•••	,,	460
vilneensis, Schult	27	260	glaucescens, Blume		,,	45 6
sp., Wall	,,	261	gracilis, Roxb		,,	458
Calaminea gigantea, Beauv.		150	gracilis, Thw		,,	442
· gigantea, R. & S	"	217	grandis, Griff		,,	463
humilis, R. & S	"	150	grandis, Kurz		"	463
Calamintha, Moench	•	650	Griffithianus, Mart.		"	440
A11 11 10 47		650	Guruba, Ham			449
	**	65 L	Helferianus, Kurs	•••	"	446
longicaulis, Benth	27	651	Heliotropium, Ham	•••	"	447
nepalensis, Fisch. & Mey.	33.			•••	"	439
repens, Benth	"	651	hostilis, Hort. Calc	•••	"	452
umbrosa, Benth	"	650	Huegelianus, Mart	:::	420	
Calamosagus harinæfolius,			humilis, Roxb		456,	
Griff	₹i.	475	hygrophilus, Griff	•••	₹1.	464
laciniosus, Griff	99,	475	hypoleucus, Kurz	•••	"	451
ockriger, Griff	. ,,	476	Hystria, Griff	•••	"	469
polystachyus, Griff	"	476	inermis, T. Anders	•••	"	456
scaphigerus, Griff		475	insignis, Griff		11	459
wallichiæfolius, Griff		475	intermedius, Griff	•••	19	464
wallichiæfolius, Mart	"	475	javensis, Bl	٧i.	442,	462
Calamus, Linn	vi.	486	Jenkinsianus, Griff	٧i.	439,	462
acanthospathus, Griff	"	448	lævigatus, Mart		vi.	477
	-	447	latifolius, Roxb	•••	,,	455
	-	457	latifolius, Kurz			458
		464	leptopus, Griff			468
angustifolius, Griff		439	1 1 1 - 32 - 41 - 14		1.9	441
arborescens, Grif	"			•••	"	465
aureus, Reinw		460	Lewisianus, Griff	•••	"	462
axillaris, Beco	"	456	Lobbianus, Becc	•••	**	
Brandisii, Becc	99	448	longipes, Griff	•••	"	471
osesius, Blume	27	456	longisetus, Griff	•••	"	440
calicarpus, Griff	"	467	longisetus, Thw	•••	"	441
castaneus, Griff	"	440	luridus, Becc	•••	"	445
castaneus, Griff	99	440	macracanthus, T. Ande	rs.	"	456
collinus, Griff vi	. 489,		macrocarpus, Griff	•••	99	489
concinnus, Mast	vi.	444	Martianus, Beco		"	159
conirostris, Becc		461	Mastersianus, Griff	•••	99	449

Calamus	Vol.	Page	Calamus	Voi	l. Page
maximus, Reinw	•	479	tenuis, Thw	v i	
melanacanthus, Mart		453	Thwaitesii, Becc		441
		454	1 41 1 77		440
7 7 7 77 777 11	•	452	tomentosus, Becc	••• ••	ARE
	• • •	456		,1	459
melanoloma, Mart			travancoricus, Bedd.	91	
Metzianus, Schlecht	- ,,	462	triqueter, Bocc	,,	
micracanthus. Griff	. ,,	467	uniferius, H. Wendl.	*** 91	
micranthus, Blume	. ,,	461	verticillaris, Griff	*** **	
mishmiensis, Griff	. ,,	445	viminalis, Willd	,,	444
monoicus, Roxb	. ,,	448	viridispinus, Becc	,,	458
montanus, Anders	. ,,	449	Wightii, Griff	,,	452
monticolus, Griff		466	zeylanicus, Becc	••• 35	AKE
multiflorus, Mart		445	sp., Griff	***)1	AMM
myrianthus, Becc		451	Calanthe, Br	¥	
1 t		458	alismæfolia, Lindl		940
, , , , , , , , , , , , , , , , , , , ,		446	alpina, Hk. f		9KA
		449		>1	940
nitidus, Mart			angusta, Lindl	054 _	
nutantiflorus, Griff		463	angustifolia, Lindl. ▼.		
ornatus, Blume	• ,,	460	australis, Hort	v i	~ 4 ^
ornatus, Griff	. ,,	460	biloba, Lindl	▼	
ovatus, Keinw	. ,,	460	brevicornu, Lindl	***);	
ovoideus, Thw	. ,,	457	carinata, Lindl	,,	
Oxleyanus, Teys. & Binn	. ,,	458	chloroleuca, $Lindl$,	852
pachystemonus, Thu		442	clavata, Lindl	,	854
pallidulus, Becc		457	colorans, Bobb. f	V	i. 195
palustris, Griff		458	comosa, Rohb. f	▼	. 851
paniculatus, Mart		459	curculigoides, Wall.		OE 4
77		480		•	955
		450	diploxiphion, Hk.f. v.	944 -	
paspalanthus, Becc					
	. 443		elytrogiossa, Rchb. f.	▼	951
perakensis, Becc		451	emarginata, Wight	1 "	
petiolaris, Griff	• ,,	466	Foerstermanni, Rehb		
platyspathus, Mart		449	fulgens, Lindl		
	i. 4 39		galeata, Lindl	,,	
polyspathus, Wall	. vi.	450	gigantea, Hk. f	,	856
Pseudo-Rotang, Mart	. ,,	444	gracilis, Lindl v.	855, v	i. 195
Pseudo-tenuis, Becc	,,,	445	grandiflora, Hort. Belg	V	i. 195
quinquenervius, Roxb		460	Griffithii, Lindl		
radiatus, Thw		442	herbacea, Lindl		252
radulosus, Becc		448	labrosa, Rchb. f. v.	856, v	i. 195
ramosissimus, Griff		450	longipes, Hk.f	vi	i. 195
D1 3-1 0-10	•	452	Mannii, Hk. f v.	850, v	105
	. 441		1 30 71 11		
			Masuca, Lindl		051
Rotang, Linn		447	Masuca, Thw	,,	OFC
Roxburghii, Griff	. ,,	448	nutans, Linn	,,	
Royleanus, Griff	. ,,	447	occidentalis, Lindl	` ,,	
rudentum, Mart	7,	441	odora, Griff	,	
rudentum, Thw	. ,,	455	pachystalix, Rchb. f.	,	
rugosus, Becc	. ,,	448	Perrottetii, A. Rich.	,	
schisospathus, Griff	, ,,	439	Petri, Rohb. f	▼	
scipionum, Lour		461	phajoides, Rchb. f. v.		
scipionum, Lam		448	plantagines, Lindl	▼	
simplex, Becc		456	plantaginea, Griff		OKO
singaporensis, Becc		454	puberula, Lindl		040
		459	1 2		OKA
		471		1	061
strictus, Miq			purpures, Lindl	11	OFA
tenuis, Roxb	,,,	447	roses, Benth	*** 31	856

Calanthe	Vol	Page	Callicarpa vo	ol. Page
rubens, Ridl	v i.	195	acuminata, Roxb i	
rubro-oculata, Paxt		195	acuminatissima, Teijs. &	
	. Ÿ.	854	Binn	, 566
sulphurea, Hort. Huege		856		, 569
tricarinata, Lindl. v. 84		195	americana, Lour	,, 569
tricolor, Hort. Huegel	. ▼.	856	arbores, Rowb	,, 567
tubifera, $Hk. f$ v. 85			arborea, Miq	,, 567
uncata, Lindl vaginata, Lindl	. v .	853		, 567
vaginata, Lindl	. ,	849		, 570
veratritolia, Br. v. St	1, V 1.	195		,, 56 9
versicolor, Lindl		851	D 1 4 4 11	,, 568
vestita, Lindl. v. 85		195		, 567
viridi-fusca Hook		820	cana, Gamble	, 568
Wightii, Rehb. f	<u></u>	851		69, 570 v. 566
Wrayi, Hk. f v. 85	U, VI.	195 853		EAN
Calanthea, Griff Calathodes, Hk. f. & T	y.	22	3 1 10 15	" KAO
palmata, Hk. f. & T.		22	J4.4. Dank	, EGO.
		118		E70
Calcearia fornicata, Bl	V1.	118	fundana Dawh	567
Calceolaria mexicana, Bentl	· · · ·	246		, 566
	. iii.	357	Town of Dath	, 569
arvensis, Linn		358	77. 1 / dalama \	, 56 8
officinalis, Linn	·· ,,	358	June 10 amb	, 568
officinalis, Linn	i. 224	. 357	1 . 1. T.	,, 567
Caligula odontocera, Klotz	. iii.	446	14 - 'Obla	,, 567
pulcherrima, Klotz	. ,,	446	1 CI: AF	, 568
Calimeris altaica, Nees .		251	Incomés Claban	,, 569
canescens, Noos		251	lanceolaria, Roxb	, 570
flexuosa, Royle	. ,,	252		, 566
integrifolia, Turcz	,,	249		,, 570
Calispermum scandens, Lour	. iii.	513		, 570
Calistemon vide Callistemma	_	249		,, 570
	v i.	533		, 56 8
	,,	532	1147 TT-LL & A	, 568 . 568
calyptrata, Roxb	. ,,	539		569
	,,	534	l	" ZOO .
	•• ,,	540		5.60
nitida, Jack oblongifolia, Roxb		529 529	1 - 6	, EGO
		532	DL	" K70
occulta, Lodd ovata, Ham		541	70 1 2 ** 50711	, 568
1 n 1		532		, 569
70 1		524	1126-12 TRF-11	569
Callæocarpus rhamnifolis	. ,, L.		1 369	, 569
Miq	v .	624	1 4 4 P-7: X87-11	, 567
	., ,,	623	tenuiflora Champ	, 569
	. vi.	491	l attimestic Matter & Dime	, 569
Calliandra, Benth	••	802	tomentosa, Lamk	, 569
cynometroides, Bedd		806	Tomew, Poir ,	, 567
Griffithii, Benth	• • •	802	vestita, Wall ,	, 567
umbrosa, Benth		802	villosa, Roxb ,	
Callianthemum, C. A. Meg	y. î.	14	villosa Vahl	, 567
cachemirianum, Camb	. ,,	14		, 567
Endlicheri, Walp	. ,,	21		57, 597
pimpinelloides, Hk. f. & T		14		7. 568
Callicarpa, Linn	. IV.	56 6	Calligonum, Linn	. 22

Calligonum	٧al.	Page	Calophylum	Vol	Page
Y	₹.	Page 22	macrocarpum, Hk. f.	iv.	Page 278
	vi.	380		,,	276
Callistemma indicum, D. Don			mesuzfolium, Wall	,,	272
lapsu Calistemon		249	microphyllum, T. Ander		272
Callistephus chinensis, Noos		249	107	,,	271
annasian Dalm		299	pieiferum, Planch & Tr		272
77 D.C	"	299			272
	"	299	WEF - 77		274
Wightianus, DC	."	484		,,	271
Callitriche, Linn	ii.			,,	272
stagnalis, Scop	79	484	Qualitation Dans	,,	276
verna, Linn	**	484		,,	271
Wightiana, Wall	77	484		,.	274
Oallostylis rigida, Bl	₩.	802		,,	
Calocedrus macrolepis, Kurz	٧,	645		,,	276
Calochlamys capitata, Presi		608		,,	271
Calonyction, Chois	ĩ٧.	197		,,	278
asperum, Chois	79	198		۲. "	275
comorenses, Bojer	"	198		,,	274
comospermum, Bojer	"	198		,,	275
comospermum, Thw	22	198	Walkeri, Wight	,,	275
diversifolium, Hassk	"	198	Wallichianum, Planch.	&r	
grandiflorum, Chois	79	198		··· ,,	278
longiflorum, Hassk	"	198	THE	,,	274
muricatum, G. Don	"	198		i₹.	. 291
muticum, Done	"	198	1 Th 1	,,	29 1
pseudomuricatum, G. Don	"	198	Calosacme acuminata,	•••	
Roxburghii, G. Don		197	Wall iv	. 849	359
speciosum, Chois	"	197	amplectens, Wall.	iv.	857
And a transmission of the contract of the cont	"	198	37 237 437 31	,,	0577
	i∀.			,,	0277
		411	314 107-11		358
Dalzellii, T. Anders depressa, T. Anders	"	410	l	,,	358
3714 37	",	410	1 2 T T T T T T T T T T T T T T T T T T	,,	844
37	"	410		iv	
	"	411	? Caloscordon swsertum,		. ,0.0
rigida, Dals	"	411	1 1	vi	. 341
Vagans, Wight		259	Calotheca, Spreng	v ii	
CALOPHYLLE	į.	271	1 2 0		884
Calophyllum, Lian	i.	272		,,	801
amonum, Wall.	"	276		99	994
angustifolium, Rosb	"			,,	884
bancanum, Miq	22	272		,,	249
Bintagor, Roxb	"	278			
bracteatum, Thw	**	274		iv	10
Burmanni, Wight	17	272		,,	
canum, Hk. f	22	271		į,,	17
chinense, Walp	33	270	Hamiltoni, Wall	,,	
cordato-oblongum, Thw.	"	275	herbacea, Wight	,,	
ouneifolium, Thw	,,	275		,,	
cymosum, Miq	,,	271		,,	
decipiens, Thw	,,	275		,,	18
decipiens, Wight	,,	274	Calpicarpium Rosburghii		
elatum, Bedd	"	274			. 689
floribundum, Hk. f	,,	272	Calpurnia, E. Mey	ii.	
gracile, Miq	,,	271		,,	
Griffithii, I. Anders	33	278	Caltha, Linn	i.	21
inophyllum, Linn	"	278		,,	21
longifolium, Wall	••	270	Govaniana, Wall		21

G-14b-			
Caltha		Vol. : ii.	Page 21
himalensis, Don	•••		21
palustris, Linn paniculata, Wall	•••	"	21
paniculata, Wall	•••	"	21
scaposa, Hk. f. & T.	•••	ïï.	449
Calycopteris, Lamk	•••		449
floribunds, Lamk	•••	"	4.9
nutans, Kurs Calyptranthes capitella	ta.	,,	710
Ham		ii.	439
caryophyllata, Pers.			490
	ii.	491,	
costata, Ham		· ii.	498
cuneata, Ham	•••	- 11	498
Danca, Ham	•••	. ,,	500
grandis, Ham	•••		498
Jambolana, Moon	•••	"	493
Jambolana, Moon Jambolana, Willd	•••	"	499
mangiferifolia, Hance	•••	"	498
obtueifolia, Ham	•••	"	481
pyrifolia, Bl	•••	"	487
Taina, Ham	•••	"	498
tenuis, Ham		"	500
Calyptrocoryne Wightii,	•-•	"	
Schott		vi.	513
Calyptrostylis, Nees		vi.	670
florida, Nees		•••	670
Calysaccion longifolium,		,,	
Wight		i.	270
siamense, Miq		••	271
Calystegia, R. Br		i۳.	217
acetosæfolia, Turcz	•••	,,	217
hederacea, Wall	•••	"	217
Keriana, Sweet	•••	"	216
Calytriplex obovata, R. &		iv.	272
Camarotis obtusa, Lindl.		٧i.	3 6
pallida, Lindl		,,	36
purpurea, Lindl	•••	٠,	36
rostrata, Rehb. f	•••	"	36
Cambessevea, sp., W. & A	٠	íí.	21
Cambogia venulosa, Bla	nco	i.	26 0
Camelina Caisir, Wall.		i.	145
CAMELINEE	•••	i.	129
Camellia, Linn		i.	2 92
avillaris, Griff		,,	293
azillaris, Roxb		"	292
avillaris, Wall		,,	282
caudata, Wall		,,	2 93
caudata, Griff		"	293
drupifera. Lour		"	293
japonica, Wall		"	282
Keina, D. Don	•••	,,	293
japonica, Wall Keina, D. Don Kissi, Wall	•••	"	293
lutescens, $Dyer$	•••	,,	293
Mastersii, Griff	• • • •	,,	293
oleifolia, Wall	• • •	,,	293
Sasanqua, Thunb	•••	,,	293
P Scottiana, Chois	•••	9.	282

Camellia	Vol. Page
? Scottiana, Wall	i . 292 .
simplicifolia, Griff	,, 298
symplocifolia, Griff	,, 293
theifera, Griff.*	,, 292
sp., Griff	" 292
? sp	,, 2 93-
Jameraria seylanica, Retz	iii. 637
seylanica?, Wight	" 6 56
Jamirium cordifolium,	
Gærtn	v. 385
Gærtn sp., Rumph	,, 385
Campanula, Linn	iii. 438
agrestis, Wall	,, 429
Alphonsii, Wall	,, 440
alsinoides, Hk. f. & T	,, 441
argyrotricha. Wall	,, 441
aristata, Wall	,, 441
Benthamii, Wall Brunonis, Wall	,, 439
Brunonis, Wall	,, 439
cana, Wall	,, 440
cana, Hk. f. & T	,, 441
Canescens, Wall	" 489
caperonioides, Klotz	,, 489
carnosu, Wali	" 437
cashmirian, Royle,.	,, 441
colorata, Wall	,, 440
dehiscens, Roxb	,, 429
eriocarpa, Bieb	,, 439
evolvulacea, Royle	,, 441
fulgens, Wall	,, 442
himalayensis, Klotz	,, 440
himalayensis, Klotz Hoffineisleri, Klotz	,, 440
integerrima, D. Don	,, 43 9
khasiana, Hk . f . g T	,, 439
lancifolia, Roxb	,, 486
latifolia, Linn	,, 439
lavandulæfolia, Reinw	,, 429
macrantha, Fisch marginata, Thunb	,, 489
marginata, Thunb	,, 429
modesta, Hk. f. & T	,, 442
Moorcroftiana, Wall	,, 44 0
nervosa, Royle	,, 440
paurad, wan	" 440
paniculata, Wall	,, 428
P peduncularis, Wall	,, 480
purpurea, Spreng ramulosa, Wall	,, 482
ramulosa, Wall	,, 440
stricta, Wall	,, 439
sylvatica, Wall	,, 439
thalictrifolia, Spreng	,, 482
Thomsoni, Hk. f. & T	,, 488
viridis, Spreng	,, 481
CAMPANULACEÆ	iii. 421
Oampanuleæ	iii . 422
* O ***	

^{*} C. Thea, Link, Enum. Hort. Berol, ii. 73, is the earliest name.

Vol. Page	Canarium	Vol. Pag	
Campanumœa, Bl iii. 435	parvifolium, A. W. Benn.	i. 53	
celebics, Bl ,, 436	pilosum, A. W. Benn	,, 58	
cordata, Maxim ,, 435	purpurascens, A. W. Benn.	,, 53	2
inflata, Clarke ,, 436	rubiginosum, A. W. Benn.	" 53	5
javanica, Bl ,, 435	rufum, A. W. Benn	,, 5 8	13
javanica, Hk. f ,, 435	Sajiga, Ham	,, 69	9
parviflora, Benth ,, 436	secundum, A. W. Benn	59	12
A 40 Wardl 400	strictum, Rowb	" 59	
Campbellia albida, Benth iv. 823	_ 1. ·	" = 9	
	WW 11	" 59	
autimaidas Wimbs 299		." ••	
- J	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	20	
1	dolichoides, Kurz	" 10	
	ensiformis, DC		
Campelepis viminea, Falc iv. 12	gladiata, DC	,, 19	
Campelia glabrata, Hassk. vi. 384	grandis, Kurz	,, 20	
marginata, Bl ,, 383	incurva, DC	,, 19	
marginata, Wall ,, 384	lineata, DC	,, 19	
mollissima, Bl " 383	Loureirii, G. Don	,, 19	
Camphora caniflora, Meissn. v. 135	lucens, Kurz	,, 2 0	
chinensis, Nees ,, 135	mollis, Wall)6
glandulifera, Nees ,, 135	obtusifolia, DC	,, 19) 6
inuncta, Nees ,, 135	товва, DC	,, 19) 6
Parthenoxylon, Nees ,, 135	rutilans, DC	,, 19	96
Pseudo-sassafras, Miq ,, 135	Stocksii, Dalz. & Gibs	,, 19	36
CAMPHOROSMEE v. 1	turgida, Grab	,, 19	96
Campnosperma, Thw ii. 40	virosa, W. & A	" 1 9	
	Candarum Roxburghii, Schott	vi. 51	
Griffithii, Marchand , 41	Cankrienia chrysantha, De		••
41 A1		iii. 48	19
2202 Op 25 100 3 2 101 3 111 111 111 111 111 111 111 111 1	Vriese Canna, Linn	vi. 26	
Cami uleia coccinea, Hook. iv. 299	.1	-36	-
Campylandra aurantiaca,		"	
		" 94	
	flavescens, Link	" 444	
, and , , , , , , , , , , , , , , , , , , ,	indica, Linn	"	
, market 1	indica, Linn	" 50	
	nepalensis, Wall	" வ	
Campylotropis, Bunge ii. 143	speciosa, Rosc	<i>"</i>	
Camunium bengalense, Ham. i. 556	Cannabines		
chinense, Roxb ,, 554	Cannabis, Tournef	40	
sinense, Rumph " 554	indica, Lamk		
Cananga, Rumph i. 56	sativa, Linn	,, 48	
P monosperma, Hk. f. & T. ,, 57	Cannez	vi. 20	
odorata, Hk. f. & T ,, 56 virgata, Hk. f. & T ,, 57 Canarium Lina , 531	Canscora, Lamk	iv. 10	
virgata, Hk. f. & T , 57	alata, Wall	,, 10	
Cultural, 200000	andrographicides, Griff.	,, 10	
balsamiferum, Moon ,, 532	concauensis, Clarke	,, 10	
bengalense, Rosb ,, 534	decurrens, Dalz	" 10	
brunneum, Bedd ,, 531	decussata, R. & S	,, 10	
coccineo-bracteatum, Kurz " 536	diffusa, Br	,, 10	
commune, Linn i. 531, 685	diffusa, ? Wall	,, 10	
euphyllum, Kurz i. 535	divaricata, Miq	,, 10	
grandiflorum, A. W. Benn. , 533	foliosa, G. Don	" 10	
hirtellum, A. W. Benn ,, 534	grandiflora, Wight	,, 10	
Kadondon, A. W. Benn ,, 535	Helferiana, Wall	" 10	
lævigatum, Miq ,, 588	lancifolia, Miq	" 10	
laxum, A. W. Benn ,, 585	Lawi, Clarke	,, 10)3
nitidum, A. W. Benn ,, 533	Lawi, Wight	" 10	13

Canscora	Vol.	Page	l v	ol. Page
	iv.	104	CAPPABIDEE	i. 167
Parishii, Hk. f	,,	105	Capparis, Linn	i. 173
pauciflora, Dalz	"	103	souminata, Willd	,, 178
perfoliata, Lamk	"	104	acuminata, Roxb	,, 174
perfoliata, Wall	"	105	accuminata, Willd	,, 178
pusilla, R. & S	"	100	ægyptiaca, Lamk	,, 173
Schultesii, Wall	"	105	apetala, Both	" 171
sessiliflora, R. & S	"	104	aphylla, Roth	,, 174
tenella, Wight	"	103	assamica, Hk. f. & T	,, 177
Wallichii, Clarke	"	105	bisperma, Roxb	, 176
sp., Wall	"	105	bisperma, Wight	,, 176
Cansjera, Juss	í.	582	brevispina, DC	" 174
malabaricu, Lamk	,,	582	carulea, Heyne	,, 175
martabanica, Wall	"	582	callosa, Bl	,, 179
parvifolia, Kurs	"	583	conspicua, Wall	" 179
Rheedii, Gmelin	"	582	corymbosa, Roxb	., 176
scandens, Roxb	"	582	divaricata, Lamk	., 174
zizyphifolia, Griff	,,	582	divaricata, Wall	,, 175
Cantharospermum albicans,	"		diversifolia, W. & A	,, 175
W. & A	ii.	215	erythrodasys, Miq	,, 178
? distans, Royle	19	216	Finlaysoniana, Wall	" 179
. nervosum, Royle	"	216	Finlaysonina, Wall	" 1 79
pauciflorum, W. & A	"	215	flavicans, Wall	,, 179
Canthium, Lam	iii.	131	floribunda, Wight	,, 177
angulosum, Wall	"	111	formosa, Dalz	,, 174
angustifolium, Roxb	"	135	formosa, Wall	" 178
campanulatum, Thw	"	135	galeata, Fres	,, 173
confertum, Korth	"	133	glauca, Wall	,, 180
corymbosum, Pers	"	102	grandiflora, Wall	" 174
didymum, Roxb	"	132	grandis, Linn	,, 1 76
didymum, Bedd	"	132	herbacea, Willd	" 173
ficiforme, Ilk. f	"	133	heteroclita, Roxb	,, 171
glabrum, Bl	"	133	Heyneans, Wall	,, 174
glomeratum, Miq	iï.	565	horrida, Linn. f	,, 178
glomerulatum, Miq	iii.	138	incanescens, DC	" 1 77
gracilipes, Kurz	,,	134	leucophylla, DC	,, 173
horridum, Bl	"	135	linifolia, Roxb	" 171
lanceolatum, Arn	"	132	longispina, Hk. f. S. T	" 176
Leschenaultii, W. & A	"	135	malabarica, Wall	" 177
lucidum, Schlecht	"	132	maximus, Roth	,, 176
macrocarpum, Thu	"	135	micracantha, DC	" 179
montanum, Thw	"	132		" 180
neilgherrense, Wight	"	133	Manuali Wints	" 175
parviflorum, Lamk	"	136		" 178
parviflorum, Schl	"	111	Manager of the back	" 173
parvifolium, Roxb	;;	135	W-11	" 173
puberulum, Thw	21	134	. L	,, 176
recurvum, Wall	"	111	"Luurd" Domlo	,, 173
Rheedii, DC		134	-1:E-1:- III. E P. III	,, 178
scandens, Bl	"	135		,, 177
thyrsoideum, Roem		40	orbiculata, Wall	" 176
travancoricum, Bedd	"	134		", 1 79
umbellatum, Wight	"	132		" 176
zizyphinum, Wall	"	135	- 1 - 1 - 117 17	" 176
107-11		136	manufic Observe	" 177
Capellia, Bl	i.	35		" 177
CAPPABEÆ	i.	168	pyrifolia, W. & A	" 174
	••			,,

Capparis	Val	Dema :	Caragana		Vol.	Page
quadriflora, DC	i.	Page 178	Gerardiana, Royle		ii.	
racemifera, DC	"	176	Moorcroftiana, Benth.		"	249
reticulata, Klein	-	175	nubigena, Bunge	•••	"	117
retusella, Thw	"	177	polyacantha, Royle	•••	"	116
Rheedii, Rottb	".	174	ру дтаза , <i>DC</i>	•••	"	116
rotundifolia, Rottb		174	spinosissima, Benth.	,	,,	116
Roxburghii, DC		175	versicolor, Benth	•••	"	116
OILAL	27	178	Carallia, Rowb		iï.	439
sabiæfolia, Hk. f. & T	"	179	calycina, Thw	•••	"	439
	"	175	ceylanicu, Arn			439
sataccensis, Di sepiaria, Linn	"	177	confinis, Bl		- , ,	439
sepiaria, Wall	"	176	corymbosa, Arn		"	439
Sodada, Br	"	175	integerrima, DC		"	439
spinosa, Lamk	"	173	lanceæfolia, Rowb	•••	"	439
stylosa, DC	"	174	lanceolaria, Wall	•••	"	439
tener, Dalz	"	179	lucida, Kurz		"	439
ternifora (tenuifora), DC.	**	178	lucida, Roxb		"	439
A.A. manage Mham	"	179	octopetala, F. Muell.			439
trifoliata, Roxb	"	172	sinensis, Arn		"	439
trinervia, Hk. f. & T	7:	175	Symmetria, Bl		"	439
	"	179	timorensis, Bl		"	439
variabilis, Wall	"	180	Caralluma, Br		iv.	76
versicolor, Griff	"	175	adscendens, Br		,,	76
771 F 0. m	"	179	attenuata, Wight	•••	"	76
Wallichiana, W. & A	"	174	crenulata, Wall		"	78
	"	174	edulis, Benth		"	76
	77	174	fimbriata, Wall			77
zeylanica, BU zeylanica, Roxb	"	178	Caranga amara, Vahl		iŸ.	275
7. * YEZ C. A	"	178	Carapa, Aubl		i.	566
sp., Griff	"	178	carnosula, Zoll		,,	562
Cap aria crustacea, Linn	iv.	279	indica, Juss	•••	• • •	567
diffusa, Roxb iv.			moluccensis, Lamk		"	567
dissecta, Del	iv.	258	obovata, Bl			567
gratissima, Roxb		266	Cardamine, Linn	•••	ï.	137
rigida, Ham	27	301	africana, Linn		,,	137
CAPRIFOLIACEÆ	iii.	1	enteniquana, DC	•••	"	137
Caprifolium japonicum, D.		-	borbonica, Pers		"	137
Don	ii i .	10	circæcides, Hk.f. & T.		"	137
macranthum, D. Don		10	debilis, D. Don		"	138
Capsella, Mænch	i.	159	elegantula, Hk. f. & T.		"	139
Bursa-pastoris, Monch	,,	159	foliosa, Wall		17	139
elliptics, C. A. Mey	"	159	Griffithii, Hk. f. & T.		"	139
procumbens, Boiss	"	159	hirsuta, Linn	•••	"	138
Thomsonii, Hk. f	"	159	hirsuta, Hk. f. & T		,,	138
Capsioum, Linn	iŸ.	238	impatiens, Linn	•••	"	138
baccatum, Wall	,,	239	macrophylla, Willd.	•••	"	139
cerusiforme, Lamk		239	macrophylla, Ledeb.	•••	"	139
Chamæcerasus, Nees	"	239	nilagirica, Schlecht.		"	138
fastigratum, Bl	"	239	pectinata, DO	•••	"	138
frutescens, Linn	•••	289	polyphylla, D. Don	•••	"	139
grossum, Willd	"	239	pratensis, Linn	•••	"	138
minimum, Roxb	"	239	subumbellata, Hook.	•••	"	138
Caragana, Lam	iï.	115	sylvatica, Link	•••	"	138
brevispina, Royle	"	116	trifoliolata, Hk.f. & T.		"	138
conferts, Benth		116	violacea, Wall	•••	"	137
crassicaulis, Benth	"	117	Wightiana, Wall	•••	"	137
cuneata, Baker	"	117	Cardamomum medium, Bo		vi.	285
	"	'				

Cardamomum	Val	Page	Carex		Vol.	Page
officinale, Salisb		251			vi.	719
Cardanthera, Ham	iv.	408	ampullacea, Good		,,	740
avana, Benth	,,	405	angustifolia, Boott		,,	747
balsamica, Benth	,,	404	aphanolepsis, Fran. d		"	787
Griffithii, Benth	,,	404	Land to Decide		"	748
pinnatifida, Benth	"	405			"	701
Thwaitesii, Benth	"	405	1 4 4.0 37		"	709
triflora, Ham	"	405	4		"	741
uliginosa, Ham	"	403	1		"	726
verticillata, Benth	"	404	1 1		"	732
Cardiolophus decussata, Griff.	iv.	272	1 TT		"	731
Cardiopteris, Wall	i.	597			"	731
javanica, Bl	"	597			"	733
lobata, Br	"	597			"	784
moluccana, Bl	"	597	1 7 7 7 1 1		"	701
Rumphii, Baill		597	avillaris, Linn		"	706
subhamata, Wall	"	598	37	: :::	"	722
Cardiospermum, Linn	ï.	669	1 10	•• •••		723
canescens, Wall		670	bengalensis, Boeck		"	716
TT-12 Linear Trians	"	670	bengalensis, Boott		"	716
microcarpum, H. B. K	"	670			715.	718
04 117-11	"	670	bengalensis, Thw		vi.	715
1	"	670	Benthamiana, Boott			709
Schmiedelia, Dalz. & Gibs.	17	670	Th	•••	"	701
	"	670	bicolor, Boeck		"	748
	ï.	373	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		"	746
Cardiostegia Kotschyi, Presl Carduncellus lanatus, Rehb.	iii.	386			"	747
~ · • • ·	iii.	361			"	786
Carduus, Linn		361	breviscapa, Clarke		"	707
acanthoides, Sm	"	361	Brizopyrum, Kunze		715	717
acanthoides-nutans	"	363			vi.	705
argyracanthus, Wall	"	374	brunnes, Thunb			710
auriculatus, Wall	"	361	cæspititie, Nees		"	711
crispus, Linn	"	380	cæspitosa, Schk		"	715
elongatus, Wall	"	373	canaliculata, Boott		"	706
heteromallus, D. Don	"	362	canescens, Linn		.99	713
lanatus, Roxb	"	361	capillacea, Boott		17	713
lucidus, Wall	"	364	capillacea, Benth		"	721
Marianus, Linn	"		capitulata, Boott		"	744
nutans, Linn	"	361	cardiolopis, Nees		27	781
obvallatus, Wall	"	365	cancasica, Stev		"	732
ramosus, Roxb	,.	383 381	celsa, Boott		"	708
radicans, Roxb	"	365	cernus, Boott		"	719
tectus, Wall	"	361	ceylanica, Boeck		"	738
Thomsoni, Hk. f	"		chinensis, Munro		"	787
trichocephalus, Wall	"	380	chlorostachys, D. Don		"	732
sp., Clarke	"	361	cinnamomea, Boott		"	
Carex, Linn	Vì.	699	coacla, Boott		"	701 7 24
acicularis, Boeck	"	748	composita, Boott		"	729
acuta, Linn	- 17	741	concolor, Nees		"	716
acutiformis, Ehrh	"	740	condensata, Nees		712	
requata, Nees	"	723		i. 715,		
Aitchisoni, Boeck	29	748	confertiflora, Boott			741
alopecuroides, D. Don	"	737	continua, Clarke		"	717
alpestris, Allioni	"	745	cooptands, Clarke		"	707
alpina, Sw	"	730	coriophora, Fisch		"	784
alpina, Boeck '	. "	748	courtallensis, Nees		"	729
alta, Boott	**	707	crassipes, Boeck	• •••	"	726

Carex	Vol Page	Carex		Val	Page
cruciata, Wahl	vi. 715	fragilis, Boott		vi.	728
cruciata, Nees	718	frigida, Boeck	•••		748
cruciata, Thw vi.	718, 719, 721	frigida, Wall		"	734
cruenta, Nees	vi. 734	fucata, Boott	•••		710
Cumingiana, Steud.	791	fuliginosa, Boeck		"	748
curaica, Kunth	709	fuliginosa, Schk		"	735
curaica, Boiss	, 701	fuscifructus, Clarke		"	742
curaica, Turcz	709	fusiformis, Nees	•••	"	736
curta, Good	706	Gardneri, Boott	•••	"	722
curticeps, Clarke	79u	Gebleri, Presc		"	739
curvata, Boott	799			"	742
curvirostris, Kunze	,, 722	glaucina, Boeck	•••	"	719
cylocistis, Boeck	,, 748	glomerata, Host	•••	"	701
cyrtostachys, Brong.	714	glomerata, Sohk		"	734
Daltoni, Boott	796	gracilenta, Boott	•••	"	730
decora, Boott	, 725	gracilis, Boott		"	747
Deinbolliana, J. Gay	701	gracilis, Br			705
desponsa, Boott	794	Griffithii, Boott	••••	"	732
diffusa, Boott	717	gynobasis, Vill		71	745
diluta, M. Bieb	797	hæmatostoma, Nees	•••	"	744
dimorpha, Boeck	7.19	hamatostoma, Jacq	•••	"	731
dioica, Linn	600	Halleriana, Asso	•••		745
disticha, Huds	704	hebecarpa, C. A. Mey.		747.	748
distracta, Clarks	715	Helferi, Boeck	• • • •	vi.	714
divaricata, Wall	vi. 715, 726	Henningsiana, Boeck.			702
diversiflora, Host	vi. 745	heterolepis, Boeck	•••	,,	748
divisa, Huds	vi. 701, 702	heterolepis, Boott	•••	,,	710
divisa, Boott	vi. 702	heterolepis, Bunge		"	710
321 O 3	709	hirta, Boiss	•••	"	747
	7.00		•••	"	747
	,,	Andrea (Albert Description)	•••	"	744
Doniana, Brieng	797	hirtella, Boott	···	"	743
duriuscula, C. A. Meye	- 701	Hostii, Schk		"	701
Duthiei, Clarke	701	hymenolepis, Nees	•••	"	743
ecostata, Clarke	790	impunctata, Boeck		: 9	698
elynoides, J. Gay	719	inæqualis, Boott	•••	"	726
	709	inanis, Kunth		"	743
eminens, Ness emodorum, Spreng	7 707	inclinis, Boott	••••	"	728
erostrata, Boott	711	incurva, Lightf	:	"	700
Esenbeckii, Boott	vi. 695, 712	incurva, Boeck		"	748
Esenbeckii, Kunth	vi. 696	indica, Linn	•••	"	714
excurva, Boott	746	indica, Boeck		"	715
ewigua, Boeck	740	indica, Munro	•••	"	715
f-11 GA	709	indica, Nees		7 i'd.	720
Walla Mana	747	infuscata, Nees			731
ferruginea, Scop	728	infuscata, Wight	•••		730
filicina, Nees	717	insignis, Boott	•••		725
filicina, Boeck	717	instabilis, Boott		"	735
A-141 D14	726	Jackiana, Boott		"	735
flssilis, Boott	vi. 714, 715	Jackiana, Thw	•••	"	785
A 0 1	vi. 742	japonica, Thunb	•••		786
A T ! .	790	japonica, Boott		"	737
Amilia D. Dam	705	"1 " 10 21" A 330 - 1		"	700
A 1	799	juncifolia, Schk	•••	"	701
	700	kashmirensis, Clarke		"	748
6-4:3- A 118-41	700	Kirilowii, Turoz	•••	"	745
7.12 D. D.	709	77 . 3 2 10.0	•••	"	741
jouosa, D. Don	,, 703	Kochiana, DC	•••	"	111

Carex	Val	Page	Carex	Vol.	Page
	. voi.	747		vi.	729
lachnosperma, Necs		747	1 30 " 5 30 11	,,	738
lachnosperma, Wall		747	l	,,	703
læta, Boott		745	1 6 11	,,	695
lævicaulis, Kunze		737	37	,,	723
Langsdorfii, Boott		746	1/ D	,,	724
Lehmanni, Drejer		730	T T	,,	723
Lehmanni, Boeck		748		. ,,	723
Lehmanni, Boott	•••	730	D '44	. ,,	713
leiocarpa, Boeck		748	. ST . A	,,	742
leiorhyncha, C. A. Mey		702		•• ,,	746
lenta, D. Don		705	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	. ,,	705
lenticularis, D. Don	• • •	708	1 . 7 1 . 6	,,	704
lepidocarpa, Tausch		739	1 / oz	. ,,	738
leptocarpa, Clarke		719	9 1 1 17 - 1 - 4	,,	718
1	•	721		. ,,	732
lanasahlana Danas	••	746	l minute Decale		733
		747	1. 1. 17 TO AA		724
ligulata, Nees		721	77. 7	., ,,	709
Lindleyans, Nees		719	37 . 3 . 37	,,	703
Lindleyana, Hk. f. & T		712		•• ,,	702
linearis, Boott		748		,,	739
linearis, Boeck		696		,,	739
linearis, Boott				"	734
lobulirostris, Drejer		741		731	
longepedicellata, Boock		748			
longiaristata, Boott	. ,,	714		, vi.	781
longicruris, Nees	. ,,	705	obscura, Munro & Boott	"	731
longicuspis, Boeck	• 17	748		,,	739
longipes, D. Don	. ,,	704		,,	746
longipes, Thw	• ,,	706		** **	741
lurida, Clarke	. ,,	742 748		** **	732
macrantha, Boeck				,,	711
macrogyna, Boott		7 44 739		,,	702
macrogyna, Turez				,,	741
macrolepis, D. Don		70 4 723	paludosa, Good ? pandanophylla, Clarke	,,	714
macrophylla, Hochst				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	724
macrorrhyncha, Kar. & Kir	• ,,	712 795		•• ' ,,	735
maculata, Boott	•••	735		,,	712
magellanica, Boeck		748		ri. 781	• ==
malaccensis, Clarke		722			
Maubertiana, Boott		747	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		716
		3, 720	1 2 2	,,	789
melanantha, C. A. Mey			patula, Host	,,	745
melanocephala, Tarez	. ,,	788		,,	729
melanolepis, Boock	. ,,	748	peduncularis, Wali	,,	713
mercarensis, Hochst	• ,,	719	pellucida, Hk. f. & T.	,,	745
micans, Boott	. ,,	735		,,	710
microglochin, Wahl	• ,,	711		,,	720
microlepis, Boeck	. ,,	748		. ,	708
Mielichhoferi, Bohk	• 11	738		,,	709
Milnei, Boott	. ,,	715	1 7 . 75	,,	709
minutiflora, Boeck	. ,,	748		,,	744
mitis, Boeck	. ,,	704		,,	709
Moororoftii, Falc	. ,,	738		,,	718
Moritzii, Steud		714		,,	665
Motoskei, Miq	• ,,	737		,,	725
munda, Boott	. ,,	727	polycephala, Boott	,,	

Carex	Vo	l. Page	Carex	Vol.	Page
polygyna, Boeck	vi	i. 748	spiculata, Boott	vi.	724
præcoz, Jacq	,,	744	stenophylla, Wahl	ri. 700	
prælonga, Clarke	,	707	stenophylla, Benth	vi.	702
præstans, Clarke	,	798	A 7 77 Th 1	,,	748
Prescottians, Boott	,	7111	1 -4'4- M-L1	,,	703
Prescottiana, H. Manu	,	710	0 - 1 D-44	,,	727
producta, Boott	,	710	1 -4 12 TO44	,,	717
pruinoss, Boott	,	700	TIT-1.1	,,	733
Pseudo-bicolor, Boeck.	••• ,	740	automation III also	,,	736
~	,	740	1.2	,,	705
		1, 732	Accessed Manage	,,	744
	vi		Acres Deeds	••	707
		RCE	4 9 Da-44	•••	710
		797	1 41- 01	•••	704
maille Decele	••• 3	7/9	Mharman Dank		715
pulla, Boeck	7 74	d, 748	1 000	•• ,,	715
				,,	747
punctata, Nees	·	700		•• ,,	721
pycnostachya, Kar. & Ki	ır. ,,			•• ,,	748
	••• ,,			•• ,,	737
	··· _ ::	719	trichostyles, Fran. & Sa	, ,,	
		8, 719		,,	696
	Vi		1	,,	748
	,,	713		•• ,,	738
	,,			,,	741
	,,			. ,,	748
repanda, Clarke	,,	72 0	uncinioides, Boott	,,	698
rhizomatosa, Steud.	,,	721	ustulata, Wahl	,,	734
rigida, Good	,,	711	ustulata, Boeck	,,	748
rigida, Strach	••• ,,	711	vacua, Boott v	i. 715,	716
1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,,	707		vi.	73 0
	,,	701	1 717 87	,,	715
Rochebruni, Franch. & Sa		706	1	,,	740
CA-7		740	1	,,	717
		749	1 2 2 22 22	. ,,	735
Daulesus Mass	• • •	TAC	Winterstalls Mann		709
		799	1 . 70 . 44	• • • • • • • • • • • • • • • • • • • •	713
rubro-brunnea, Clarke		710	1		711
	• • • • • • • • • • • • • • • • • • • •	733			702
7	••• ,,	710		•• ,,	725
	,,	720		. ,,	747
~····	••• ,,			•• ,,	747
	,,	711		•• ,,	747
	,, ,,			,,	708
Schlagintweitiana, Boed	, ,,	748	1 222	,,	•
	,,	789	Wightiana, Nees	-:7	720
	,,		Wightiana, Boott vi	. 117,	720
	9,	728	Winterbottomi, Clarke .	v1.	721
	,,		Zollingeri, Boeck		746
	,,	73 8	sp Griff vi. 70	l, 742,	746
	,,	743	1 FD. Nees	Vl.	743
	,,	743	sp., Wall. vi. 702, 704, 705	i, 70 9 ,	710,
setosa, Boott	,,	745	714, 715, 716, 717, 718,		
	,,	708	780, 734, 737, 743, 747.		,
socia, Boott	,,	709	D 1	ii.	510
	,,	739		,,	511
	,,	740		. ,,	510
7/ 17		729	0.00	••	510
87		700			509
ahrargara) ricco	••• ,,	, 24	i macroomengo, oues	,,	000

				Vol	Page
orbiculata, Miers	ii.	511	Carria speciosa, Gardn	i.	292
pendula, Griff	,,	509	Carthamus, Linn	iii.	385
sphærica, Rowb	"	511	lanetus, Linn	"	386
	iŸ.	145	Oxyacantha, Bieb	"	386
	ii.	599	tinctorius, Linn	"	386
CABICEÆ	vi.	587	tinctorius, Clarke		386
	iii.	630		", V .	188
Carandas, Linn	11	680	Carua, Ham Carum, Linn	ii.	680
	630.		anethifolium, Benth	"	683
	iii.	631	Bulbocastanum, C. Koch		681
diffusa, Roxb		631	Carui, Linn	"	680
	**	631	combinum Danish	"	682
1 F	"	631	? diversifolium, Clarke	"	681
	"	631	171-1	"	683
lanceolata, Dalz	"	631	khasianum, Clarke	"	682
1 11 777 11	"	631	1 16.71. 331.1	"	681
	"	631		"	681
	"	631	Roxburghianum, Benth.	"	682
- 1 DO	"	631	-1'-1	"	681
	"	632		¥.	470
suavissima, Bedd	"	631	Carumbium baccatum, Kurz insigne, Kurz		471
villosa, Roxb	621,		1 7.6 1	"	469
		85		"	469
Carlemannia, Benth	iii.		populneum, Muell	"	470
congesta, Hk. f	"	85	sebiferum, Kurz	"	212
Griffithii, Benth	"	85	CARYOPHYLLEÆ	1.	
tetragona, Hk. f	. "	85	CARYOPTERIDEÆ	iv.	561
Carmona heterophylla, Cav.		144	Caryopteris, Bunge	i₹.	597
Carowylon fastidum, Moq	▼.	18	grata, Benth	"	597
indicum, Wight	"	15	grata, Ham	"	596
recurvum, Moq	"	15	paniculata, Clarke	"	597
salicornicum, Moq	??.	16	Wallichiana, Schau	"	597
Carpesium, Linn	iii.	300	Caryota, Linn	vi.	422
abrotanoides, Linn	"	301	furfuracea, Bl	"	428
cernuum, Linn	"	800	Griffithii, Becc	"	428
oernuum, DO	"	301	horrida, Moon	,,	415
ciliatum, Wall	"	801	mitis, Lour	"	428
nepalense, Loss	"	301	mitis, Hb. Calc	,,	419
nepalense, Wight	"	801	mitis, Willd. ?	"	413
pedunculosum, Wall	"	301	nana, Wall	"	423
pubescens, Wall	-"-	801	obtusa, Griff	,,	422
racemosum, Wall iii.			obtusidentata, Griff	"	422
trachelifolium, Less	iii.	801	Pochlandra, Hance	"	423
Carpha junciformis, Boock.	₹i.	674	propinqua, Bl	"	423
Carpinus, Tourn	▼.	625	sobolifera, Wall	"	423
faginea, Lindl	,,	626	urens, Linn	"	422
viminea, Wall	"	626	urens, Jacq	22	423
Carpophora Hoffmeisteri,			urens, Jacq	ii.	591
Klotz	i.	22 0	racuminata, Wall	"	595
Carpopogon anguineum, Roxb	. ii.	185	albicans, Wall	"	593
atropurpureum, Roxb	"	186	Anavinga, Dalz. & Gibs.	"	593
bracteatum, Roxb	"	187	angustata, Teys. & Binn.	"	592
capitatum, Roxb	"	187		"	595
gigantoum, Roxb	"	186	Cansiala, Ham ii. 592,	593,	594
imbricatum, Bozb	"	185	Championii, Thw	ii.	592
monospermum, Boxb	"	185	cinerea, Turcs	,,	594
niveum, Boxb	"	188	coriaces Thw		592
pruriens, Roxb	33	187	? coriacea, Wallii. 59	5, v	. 460
			•	-	

Casearia	Vol.	Page	Cassia .		٧o١.	Page
Dallachii, F. Muell	jı.	593	gallinaria, Collad		ii.	263
elliptica, Willd	. ,,	593	glauca, Lam		,,	26 5
esculenta, Roxb	,,	592	herpetica, Jaoq		,,	264
glabra, Hort. Calc	. ,,	598	hirsuta, Linn		"	263
glabra, Roxb	. ,,	591	Horsfieldii, Miq	•••	,,	265
glomerate, Roxb	,,,	591	humilis, Collad	• • • • •	,,	263
graveolens, Dalz	. ,,	592	javanica, Linn	•••	,,	267
grewiæfolia, Vent	, ,,	594	Kleinii, W. & A lanceolata, Wall		,,	266
Hamiltoni, Wall	,,	592		•••	٠,	264
Kurzii, Clarke	٠,,	594	Leschenaultii, Wall	•••	**	266
læviyata, Dalz	,,	592	marginata, Roxb	•••	,,	262
leucolepis, Turcz	,,,	591	mimosoider, Linn	•••	"	266
Lobbiana, Turcz	,,,	594	montana, Heyne		"	264
Plucida, Wall	"	595	myriophylla, Wall	•••	"	266
macrocarpa, Clarke	,,,	598	nodosa, Ham	•••	"	261
macrogyna, Turcz	"	592	obovata, Collad		"	264
ovata, Roxb	"	593	obtusa, Roxb		"	264 263
ovata, Wall	,,,	591	obtusifolia, Linn		"	
paniculata, Gardn		595 509	occidentalis, Linn	•••	"	262 265
rubescens, Dalz	,,,	593	palmata, Wall		"	266
subcuneuta, Miq		594 593	prostata, Roxb		"	266
tomentosa, Roxb			pumila, Lam		"	263
Vareca, Rosb	• • •	593 594	purpurea, Roxb		"	262
variabilis, Bl	"		renigera, Wall		"	261
varians, Thw		592 5 91	rhombifolia, Boxb		"	266
?viridiflora, Lamk		594	Rooburghiana, Grah.	•••	"	262
wynadensis, Bedd	"	592	Rowburghii, DC		"	264
zeylanica, Thw	"	635	Senna, Linn sensitiva, Roxb		"	266
Casparya? oligocarpa, DC		635			"	265
0 . 11		636	7		"	264
On and a Time	::	261	Sophera, Linn	• • • • • • • • • • • • • • • • • • • •	"	262
Absus, Linn		265	Sophera, Wall		"	262
alata, Linn		264	speciosa, Roxb		"	265
amæna, Ham		266	suffruticosa, Koen		"	265
angustifolia, Vahl		264	suffruticosa, Wall		"	265
angustissima, Lam		266	sumatrana, Roxb		. ,,	264
arborescens, Vahl	,,	265	surattensis, Burm		,,	265
auricoma, Grah		266	Telfairiana, Wall		"	266
auriculata, Linn		268	tenella, Boxb		"	266
Bacillus, Gærtn	,,	267	timoriensis, DC		"	265
bicapsularis, Linn	"	263	tomentosa, Linn		"	263
bracteata, Linn. f		264	tomentosa, Wall	•••	"	263
Burmanni, Wight		264	Tora, Linn	•••	"	263
chinensis, Jacq		262	toroides, Roxb	•••	"	263
coccinea, Wall		26 5	Wallichiana, DC	•••	. 11	2 66
coromandeliana, Jacq		262	Wightiana, Grah	•••	,,	268
dimidiata, Klein		266	CASSIRÆ		ii.	61
dimidiata, Roxb	,,,	266	Cassine discolor, Wall.	•••	i.	614
esculenta, Roxb	,,	262	ewcelsa, Wall	•••	.,,	608
evigua, Roxb	,,	265	Cassiope, D. Don		iii.	459
fastigiata, Vahl	,,	265	fastigiata, D. Don		,,	459
Fistula, Linn	"	261	selaginoides, Bk. f.	§ Т.	"	460
florida, Vahl	37 .	264	Cassumunar Rowburghii,	Uolla	₹i.	248
fætida, Pers	* **	262	Cassytha, Linn		y.	187
fatida, Salisb	* **	263	americana, Meissn		23	188
frutescens, Mill	* **	262	capillaris, Meissn	• •••	**	188

Cassytha	Vo'.		Catabrosa	V	ol. P	age
filiformis, Linn	. ▼.	188	aquatica, Duthie	'	vii.	311
guineensis, Moissn	. ,,	188	? frigida, Phil	··· .	3ïı,	310
CASSYTHEÆ	₹.	117				
Castanea argentea, Bl		621			312,	
brevicuspis, Miq		62 L		•••	vii.	
costata, Bl		621	sikkimensis, Stapf	•••	,,	311
diversifolia, Kurz		620		•••	,,	311
echidnocarpa, Hk. f. & T.	"	628			312,	
Falconeri, Hance		622	Catamizis, Thoms		iii.	389
glomerata, Bl		623	baccharoides, Thoms.		"	389
indica, Boxb	•	620	Catapodium filiforme, Nees	vii.	287,	,288
inermis, Lindl	••	623	fusiforme, Benth		vii.	287
javanica, Bl		620	unilaterale, Griseb.	•••	,,	356
martabanica, Wall	• • • • • • • • • • • • • • • • • • • •	621	Catappa Benzoin, Gertu.		ii.	444
microcarpa, Lindl		623	domestica, Rumph		,,	444
montana, Bl		621	litorea, Rumph		17	444
Ppurpurella, Miq		611		•••	11	444
rhamnifolia, Kurz		624	Catenaria laburnifolia. Ben	th.	ni.	163
	•••	621	Catha Benthamii, Gardn.			•
Rowburghii, Lindi		616	Champ	,	i.	618
semicristata, Kurz		621	emarginata, G. Don	•••	••	62 1.
spectabilis, Miq		622	fruticosa, Thw	•••	,,	619
sphærocarpa, Lindl	. 61 6 ,		Heyneana, Walp	•••	,,	620
	_ `	624	monosperma, Benth.		"	618
Tungurrut, Wall	_	619	montana, G. Don		,,	621
Castanopsis, Spach		621	ovata, Walp			619
argentea, A. DC		622	Rothiana, Walp		,,	620
argyrophylla, King		622	rufa, G. Don		".	620
armata, Spach		623	Wallichii, G. Don	•••	,,	621
armata, D. Don		62 l	zeylanica, G. Don	•••	"	641
castanicarpa, Spach		621	Catharanthus roseus, G. D		iïi.	640
catalpæfolia, King					i.	119
Clarkei, King		623 620		•••		119
costata, A. DC				•••	iŸ.	181
discocarpa, Hance	. ,,	616	Catonia elliptica, Vahl			181
diversifolia, King	. ,,	620	glauca, Vahl	•••	"	580
echidnocarpa, A. DC	- ,,	623	Caturus spiciflorus, Jacq.		▼.	417
ferox, Spach	. ,,	623	spiciflorus, Roxb	•••	ii.	718
Hullettii, King	. ,,	623	Caucalis, Linn	•••		718
Hystrix, A. DC	. ,,	62 0	Anthriscus, Scop	•••	"	718
indica, A. DC	. ,,	620	elata, Wall	•••	. 11	719
javanica, A. DC	,,	620	latifolia, Linn	•••	"	719
lanceæfolia, Kurz	. ,,	616	leptophylla, Linn	•••	"	
	,,	623	Caulinia alzanensis, Poll.	•••	V 1.	569
nephelioides, Aing	,,	624	fragilis, Willd	•••	"	569
	,,	624	indica, Wall indica, Willd	• • •	**	569
	,,	623	indica, Willd	•••	**	569
tribuloides, A. DC	,,	622	ovalis, Br	•••	₹.	663
tribuloides. A. DC	,,	623	Cautleya, Royle	• • •	¥ì.	208
	,,	62 0	Cathcartii, Baker	•••	,,	208
Walliohii, King	,,	624	lutea, Royle	•••	"	208
	,,	624	petiolata, Baker	•••	**	209
	₹.	598	robusta, Baker	•••	19	200
equisetifolia, Forst.	,,	59 8	mpicata, Baker		"	209
	., ,,	598	Cavallium urens, Schot	ιde		
CASHARINER	., ₹.		Endl		1.	855
Catabages Reques. vii. 81	0. 846	3, 421	Ceanothus asiaticus, Lam	r	i.	642
aquatica, Beauv	. vii	. 810	capsularis, Forst	•••	"	642

Ceanothus	Vol.	Page	Celastrus	Vol.	Page
· · · · · · · · · · · · · · · · · · ·	i.	641	owyphylla, Wall	i.	619
1 1	,,	640	pallida, Wall	*** ;;	621
paniculatus, Roth	,,	617	paniculata, Willd	••• ,,	617
triqueter, Wall	,,	689	pauciflora, Wall		618
Wightiana, Wall	,,	639		i. 618, ii.	312
	,,	641	rigida, Wall	i.	621
Cecicodaphne glaucescens, N	ees v		robusta, Roxb	;;	622
Oedrele, Linn	i.	568	Rothiana, R. & S	17	617
	,,	569	Rothiana, W. & A.	,,	620
	,,	568	Royleana, Wall	11	620 620
hezandra, Wall	••• ,,	568	rufa, Wall	"	621
A 14.11 TZ	,,	568	P senegalensis, Lamk	,,	620
? multijuga, Kurs	••• ••	569 568	serrulata, Roth	,,	620
a a constant de la constant	••• ,,	568	spinosa, Royle	;;	618
em 15. 1	••• ,,	568	stylosa, Wall trigyna, Lamk	11	618
0 1 . L TO CI	••• ,,	568	1 777 11	,,	618
0/22	••• ,,	568	1 17 17 1 79 1	i. 199,	
	••• "	568	Wallichiana, Spreng.	• '	620
A	i.	541	Wallichiana, Wall		620
O-3 7 1	1. ▼.	653	Wallichiana, W. & A.	,,	621
Thur. 2 a		658	? Wightiana, Wall.	··· "	617
T 11	••• ,,	653	zeylanica, Roth		641
A	ï.	350	Celosia, Linn	iv.	714
(Inn.)	i.	606	albida, Willd	,,	717
<i>a</i> , , , , , , , , , , , , , , , , , , ,	iii.		allmanoides, Moq	,,	715
	, 625,	ii. 3,	argentes, Linn	;,	714
		. 536	aspera, Roth	,,	717
CELASTRINEÆ	i.	606	baccata, Retz	,,	714
Celastrus, Linn	i.	617	cernua, Boxb	,,	715
aouminata, Wall	,,	570	coccinea, Linn	,,	715
	,,	617	comosa, Retz	,,	715
Pattenuata, Wall	,,	619	corymbosa, Willd	i.	245
bivalvis, Jack	,,	614	cristata, Linn	iv.	715
	,,	621	dichotoma, Heyne	,,	717
	,,	621	exstipulata, Hornem.	,,	715
crenulata, Wall	,,	618	glauca, Rottl. & Willd.	,,	716
	1,	617	lanata, Linn	,,	727
emarginata, W. & A.	,,	621	linearis, Sweet	,,	714
	,,	621	margaritacea, Linn	,,	714 716
7	,,	618 623	missionis, Wall	,,	729
	,,	620	Monsonia, Retz	,,	717
777 7.77 This All	,,	618	nodistora, Linn nodistora, Wall	,,	717
	,,	618	patula, Willd	,,	716
7 . * 7 . * 757 - 11	,,	618	polygonoides, Rets		715
17 . ' . m	,,	617	polygonoides, Wall	,,	715
milaumatha Damb		618	pulchella, Moq	,,	715
	,,	618	pyramidalis, Burm.	iv. 715,	
mandania Dall	,,	621	sanguinea, Hoffm	iv.	716
	,,	621	spinescens, Hb. Russel	,,,	780
multiflora, Roxb	,,	617	thyrsiftora, Wall	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	716
4 337-33	,,	619	trigyna, Willd	,,,	715
nutans, Roxb	٠٢٠ ,,	617	CHLOSINA	iv.	718
Address of Carlotte Design	,,	618	Celsia, Linn	i v.	251
	,,	617	coromandeliana, Vahl	,,	251
ovata, Wall	,,	619	viscoss, Roth	',,	261

Celsia	Vol	. Page	Cenchrus		Vol.	Page
137' 14	iv.		montanus, Nees		vii.	Page 89
^	v.	4	muricatus, Linn	•••	,,	96
C 1.1 T 1	v.	481	muricatus, Hb. Russ.	•••	"	97
Acata, Ham	,,	482	mutabilis, Wight			88
1 177/113	,,	484	niloticus, Fig. & Not.	•••	"	90
	,,	484	orientalis, Willd	•••	"	86
	,,	482	paniceus, Heyne	•••	17	82
	,,	482	pennisetiformis, Hoohs	t. v	ii. 8	8, 89
7 4 387 11	,,	484	purpurascens, Thunb.		vii.	. 85
	••• ,,	482	quinquevalvis, Ham.		,,	89
3 37 MIL	••• ,,	483	racemosus, Linn		,,	97
ÿ , <u>TX7</u> 11	,,	589	ramosissimus, Poir	•••	,,	85
	,,	482	rufescens, Dest		99	88
7 1 Trú 1	,,	482	Schimperi, Hochst		,,	89
rr vi Tu	,,	482	setigerus, Heyne	•••	99	89
77. 487 33	,,	482	setosus, Šw	•••	,,	87
	,,	484	spicatus, Cav		"	82
1 171 1 1 101	,,	483	tripsaceus, Linn		99	96
T 7 * 4 T T * NN7 - 11	,,	484	tripsacoides, Br	•••.	**	89
" . ' ' TT1 A A (7)	,,	486	uniflorus, Ehrb	•••	**	89
TO 1 7 11 TO 1 L	,,	482	Cenia, Juss		iii.	316
41 701 1	,,	482	turbinata, Pers		"	816
	,,	482	Cenolophon, Horan	•••	vi.	242
4 4. 3 377.33	,,	589	vittellinum, Horan		**	243
	,,	484	Centaures, Linn	•••	iii.	3 84
	,,	482	Calcitrapa, Linn		"	385
Th. 1	,,	488	Cyanus, Linn		"	384
TTT 1. 11 001	,,	483	depressa, M. Bieb		"	885
Wightii, Planchiv.	716, v	. 48 3	divaricata, Wall		"	383
C	vii.	. 89	iberica, Stev		"	385
The second second	,,	296	lanata, Roxb		"	384
	,,	82	melitensis, Linn	•••	"	385
4 7	,,	88	pallida, Wall		"	379
	,,	90	patula, DC	•••	"	8 83
16.12 . Dage	,,	86	phyllocephala, Boiss.	•••	"	385
1.20	,,	89	taraxicifolia, D. Don	•••	,,	370
1 11 12 17	,,	89	Centaurium malabaricus	n,	••	
1	,,	89	Borkh	•••	iv.	104
41 41 TO 227 -	,,	90	Centipeda, Lour		iii.	817
ciliaris, Linn	•••	88	minuta, Benth		17	.817
3	,,	88	orbicularis, Lour	•••	,,	817
	,,	90	orbicularis, Clarke	•••	"	317
	,,	90	Centotheca, Desv	•••	vii.	831
3 37-31	. ,,	89	affinis, Wall	•••	"	831
7	,,	88	lappacea, Desv	•••	"	882
A 4 . OJ-1	,,	304	latifolia, Trin.	•••	"	882
minute of Time A	,,	159	parviflora, Anderss.	•••	"	382
	,,	86	Centranthera, Br	•••	iv.	80 0
7 7 7	,,	84	Brunoniana, Benth.	•••	"	801
0.1	1,	85	Brunoniana, Thw	•••	"	801
7	,,	90	grandiflora, Benth	•••	"	8 01
77	,,	58	hispida, <i>Br.</i>	•••	,	301
7 7 7	,,	832	hispida, Benth	•••	"	801
7 M	,,	89	humifusa, Wall	•••	"	301.
7. · · ·	,,	97	nepalensis, D. Don	•••		801
7 10 11 77 7 1	,,	88	procumbens, Benth.	•••	.!!	801
	,,	89	Centratherum, Cass		iii.	227
YOL. VII.					R	
					ĸ	

Centratherum	Val	Page	Cephalostachyum	Vol.	Page
chinense, Less	***			vii.	
courtallense, Benth		227	Griffithii, Kurz		411
		228		"	412
Hookeri, Clarke		228		"	412
Metsianum, Hk. f			pallidum, Munro	"	418
molle, Benth	29	227	pergracile, Munro	"	
phyllolænum, Benth	,,	228	schizostachyoides, Kurz	,,	398
reticulatum, Benth	• >>	227	virgatum, Kurz	.!!	414
Ritchiei, Hk . f	"	228	Cephalostigms, A. DC	iii.	428
scariosum, Olarke	• ••	286	anagalloides, Royle	"	429
tenue, Clarke	33	228	flexuosum, Hk. f. & T	**	428
Centrophorum chinense, Trin.		188	hirsutum, Edgew	"	429
Centrostachys aquatica, Wall.	į٧.	730	hirsutum, Hk. f. & T	"	428
diandra, Wall		731	Hookeri, Clarke	"	429
Centrostemma Lindleyanum		•	paniculatum, Wall	"	429
Done		52	paniculatum, A. DC		428
1.14		52	Schimperi, Hochst	"	428
		53		"	439
sp., Hk. f. & T			spathulatum, Thw	"	429
Centrostylis seylanica, Baill.		419	sp., Hk. f. & T.		
Centunculus, Linn	11i.	506	Cephalotaxus, Sieb. & Zucc.	▼.	647
tenellus, Duby		506	Griffithii, Hk. f	"	648
Cephaelis, Sw	üi.	178	Mannii, Hk. f	"	647
cunesta, Korth	"	178	Ceramium tomentosum, Bl	٧.	73
Griffithii, Hk. f		178	Cerasiocarpum, Hk. f	ii.	628
herbacea, Kurz		178	P Maingayi, Clarke	••	629
Ipecacuanha, Rich		178	? penangense, Clarke	"	6 29
stipulacea, Bl		178	zeylanioum, Hk . f	"	629
Cephalandra, Schrad		621	Cerastium, Linn	í.	227
indica, Naud		621	aquaticum, Linn		229
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		621	andifolium Damb	"	244
		621	de harioum, Roxo	11	227
Schimperi, Naud	- 1	124	dahuricum, Fisch glomeratum, Thuill	27	228
Cepbalanthera, Rich	▼1.			"	
acuminata, Lindl	• ,,	125	grandiflorum, D. Don	"	228
cucullata, Boiss	. ,,	125	indicum, W. & A	"	227
ensifolia, Rich	. ,,	125	membranaceum, Jacquem.	"	228
grandistora, S. F. Gray	• • • • • • • • • • • • • • • • • • • •	125	napalense, Wall	"	228
Royleana, Regel	. ,,	126	Thomsoni, Hk. f	**	228
Thomsoni, Rchb. f	. ,,	125	trigynum, Villars	"	2 27
syphophyllum, Rohb. f	. ,,	125	triviale, Link	"	228
Cephalanthus, Linn	. iii.	28	vulgatum, Linn	23	228
aralioides, Ž. & M	iii. 2	4, 25	Cerasus acuminata, Wall	ii.	817
chinensis, Lamk			capricida, Wall	"	316
naucleoides, DC		24	cornuta, Wall		315
occidentalis, Linn	• ••	24	glaucifolia, Wall	"	316
	••	25	integerrima, Wall	"	317
Cephalaria cachemirica, Done				"	817
		418	7 1 . 37	"	816
Cephalocroton indicus, Bedd		419		"	316
leucocephalus, Muell			martabanica, Wall	"	
seylanicus, Baill		419	nepalensis, Ser	"	316
Cephaloschænus articulatus			Phoshia, Ham	"	814
Nees	, vi.	670	Pseudo-cerasus, G. Don	"	815
longirostris, Nees?	, ,,	669	Puddum, Wall	19	814
longisetis, Nees	. ,,	669	punctata, Hk. f	19	317
parvus, Nees		668	rufa, Wall	99	314
seylanicus, Nees		670	tomentosa, Wall	"	814
Cephalostachyum, Munro		411	undulata, Ser	"	816
capitatum, Munro		412	Ceratanthera, Lestib	νi.	204
flavescens, Kurs		418	Oeratocephalus, Monch	i.	16
MET 4500 May	"		1		70

	47 _	. D
Ceratocephalus Vol. Page Ceriops	vo ii	l. Page . 486
January 2 0224		
OTEROCETUS, DC 10 Ceriscus	fragrans, Nees iii	
	arious, Geertn	
? Ceratogynum rhamnoides, Cerocarp		473
Wight v. 335 Cerochili	us rubens, Lindl vi	
Ceratolobus, Bl vi. 477 Ceropeg	i a, <i>Linn</i> iv	
Kingianus, Becc 477 acumi	nata, Rocb ,,	70
levigatus, Becc ,, 477 acumi	nala, Dalz. & Gibs.,	70
Ceratonychia Nidus, Edgew. iv. 712 albiflo	ra, Hk.f ,	P.E
Ceratophorus sp., Maingay iii. 547 angus	tifolia, Wight ,	70
CERATOPHYLLEE V. 689 angus	tifolia, Dalz ,	27
	Nimmo ,	78
	tiana, Wight ,	77.4
	LT1.	07
indiana Willa RIO Dadde	umai III f	75
7 240	T !	75
, , , , , , , , , , , , , , , , , , , ,	111 177 4	74
amusanaham Cham 640 hamita	.114. 1013	. ee
tit "	ubulata, Bedd,	67
popoguousioni, 022221 111), 02220	sa, Rowb ,	
	elabrum, Linn,	
	elabrum, Roxb,	
	labrum, Thw ,	
Ceratostachys arborea, Bl ii. 747 ciliata	, Wi ght ,	
Ceratostema angulatum, Griff. iii. 447 Decai	sneans, Wight ,	
miniatum, Griff ,, 445 Decaid	in camp Mid	, 42
	ıs, Wall ,	, 68
vacciniaceum, Roxb ,, 452 Billiot	uli Un. e	, 70
variegatum, Griff ,, 416 ensife	lia, Bedd ,	78
	wie Pilane	, 68
	fera, Bedd ,	00
Griffithii, Clarke ,, 481 Gardi	neri, Hook ,	40
	a, W. & A ,	71
braccata, Rohb. f ,, 826 hirsut	- 107:mb4	71
		70
		71
	manadiana Dana	70
himalaica, Hk. f. v. 826, vi. 198 P Jacq lancifolia, Hk. f. v. 826, vi. 193 junce	Donk	AQ
		, 80
		27
	. Hk. f ,	
pendula, Hk. fv. 826, vi. 198 longi	7.77. TTL 40 B. M	, 69
retisquama, Rohb. f v. 826 longif	oua, Hr. r. & T	, 73
		, 78
	i, Grah	, 68
Cerbera, Linn iii. 637 maore	antha, Wight	, <u>74</u>
dichotoma, Lodd ,, 645 mican	s, Nimmo	, 75
fruticosa, Ker ,, 639 mucro	nata, Roth	, 70
lactaria, Ham ,, 638 ? Mus	nata, Roth	, 67
laurifolia Lodd 638 myso:	rensis. Wight	, 69
Manghas, Linn , 645 ocular	to Track	,, 72
Manghu, Linn , 688 odora	An 17	, 75
Odollam Garta 688 ophio	cephala, Dals	70
parviflora, Wall , 688 puber		, 78
salutaris, Lour iii. 421, 688 pusill		, 66
Cercocoma singaporiana, Wall. iii. 656 Pephe		00
777-11/-1 1/2 351- AG7 amban	andle Done	, 66
	ile Wieks	" ãã
	2. TIL A A M	an an
Candolleana, Ann See 1. aptrol		,, 07

Ceropegia	Vol.	Page	Chailletia	V ol.	Page
Stocksii, Hk. f	ív.	74	edulis, Kurz	i.	594
Thwaitesii, Hook	,,,	71	gelonioides, Hk. f	,,	570
tubeross, Rozb	,.	70	1	,,	571
tuberosa, Wall	,,	71	Helferiana, Kurz	,,	570
vincæfolia, Hook		72	1	,,	572
Walkerise, Wight	"	69		,,	572
Wallichii, Wight	"	67	1	,,	571
Wightii, Grah		68		,,	570
771 6 6 66	iv. 6		107-11	•••	572
A		3, 63	1 A	i.	569
A	iv.	229			164
CESTRINÆ	ıv.	223		11. i.	502
Chænolobium decemjugum,	21	253	Chalcas intermedia, Ruem.		503
Miq septemjugum, Miq	ii.			,,	502
	"	253		,,	
Chæradoplectron Spiranthes,		3.00		20	503
Schau	vi.	163	· · · · · · · · · · · · · · · · · · ·	v.	580
Cherophyllum, Linn	ii.	690		39	580
acuminatum, Lindl	"	691		,,	580
aromaticum, Jaoq	,,	691	Chamæbuxus, Tourn	i.	200
aureum, Linn	,,	691	arillata, Hassk	,,	200
cachemirioum, Clarke	"	691	paniculota, Hassk	,,	200
capnoides, Benth	,,	691	Chamæcladon, Schott	VI.	5 31
gracillimum, Klotz	,,	671	angustifolium, Schott .	,,	533
millefolium, Klotz	"	67 L	a Carrier a si co	. ,,	534
T ! 31		691	1 70 100	. ,,	534
	690				535
Chætaria Ascenscionis, Beauv.		225		• • • • • • • • • • • • • • • • • • • •	5 3 6
		225	0.1.4.	13	535
cærulescens, Beauv	"	225		"	.532
canariensis, Beauv	"			,,	535
curvata, Nees	"	225		;;	
cyanantha, Nees	,,	225	Chamæmelium præcoz, Visia	• •	
depressa, Beauv	"	225		vii.	62
depressa, Wight	"	225		,,	68
elatior, Beauv	,,	225		,,	62
gigantea, Beauv	,,	225		,,	62
Hystrix, Beauv	,,	226		,,	62
Hystrix, Wight	"	225	paradoxa, Poir	,,	62
mauritiana, Nees	"	225	spinescens, Poir	,,	62
murina, Nees	. ,,	227 .	spinosa, Beauv	,,	62
Royleana, Nees	"	227		., ii.	360
setacea, Beauv	"	225	ankalan Dama	,,	36 0
trichodes, Nees	"	224	Chamærops excelsa, Thunb.		436
Chætocarpus, Thw	₹.	460	77 77 1	. ,,	436
castanocarpus, Thw		460	A. 10 (1) T = 33	,,	436
castanocarpus, Thw	ïi.	595	1.1	•• ••	486
•	٧.	461	Martiana, Wall.	•	436
		461	D	,,	429
pubescens, Hk. f	450			,,	717
	460,			i v .	
Chætocyperuscostulatus, Nees	vi.	629		,,	717
Limnocharis, Nees	"	629		,,	718
setaceus, Nees	"	629		,,	717
Chætospora calostachya, Br.	₹i.	678		,,	718
nigricans, Kunth	. >>	673		,,	718
Chatostachys multifida, Benth	ı. iv.	681	dichotoma, Moq	,,	717
Chailletia, DC Brunoniana, Wall	i.	570	javanica, Hassk	,,	717
Brunoniana, Wall	,,	570		,,	718
deflexifolia, Turcz	"	571		,,	717
	•••				

Vol. Pa	LOTA I		Vol.	Page
	36	Cheilotheca, Hk. f		477
	36	khasiana, Hk . f		477
	34	Cheiranthus, Linn	1,	182
an Christ	36	albiflorus, T. And		188
	61	Cheiri, Linn	"	182
	68	Farsetia, Wall		140
	61	himalaicus, Hk. f. & T		132
A1 7 T	81			132
	75			182
Chaptalia gossypina, Royle iii. 3	90	C14		132
manima D Don 0	91			183
A	82	Sp., HK. I. & I vi. Cheirostylis, Bl vi.	104,	
annonna Mart	82	A	vi.	105
A) 11 A	76	Chairman		105
		malleifera, Par. & Rehb. f.	>)	105
		14 14 'V' 11'	"	105
	65		"	106
3/3- Mi- 1		pubescens, Par. & Rchb. f.	: 00	
	76		i. 99,	
	74	Chelonanthera speciosa, Bl		834
	72	sulphurea, Bl	• • • • • • • • • • • • • • • • • • • •	833
,	77	Chelone filiformis, Ham		362
	76	latifolia, Ham		374
	76	rubicunda, Ham	"	362
	95		247,	
Chavannesia esculenta, A. DC. iii. 6		Chenoles, Thunb	▼.	.9
lucida, A. DC ,, 6	58	divaricata, Hk. f	**	10
Chavica Arnottiana, Miq v.	86	P sedoides, Hk. f	,,	10
Betle, Miq ,,	85	CHENOLEER		3
	85	CHENOPODIACEZE	v.	1
	85	CHENOPODIEZE	٧.	1
	96	Chenopodina indica, Wight	₹.	14
	87	maritima, Moq		14
	85	parvifora, Moq	•••	15
macrostachya, Miq ,,	85	prostrata, Moq		15
maritima, Miq ,,	84	pygmæa, Moq. P		15
	85	Chenopodium, Linn		. 3
Wallania Mia	87	album, Linn		8
	88	ambrosiodes, Linn		4
-fair-man Via	84	Augustanum, All		10
	83	Blitum, Hk. f		5
manufaides Wiels	84	Botrys, Linn		4
. 16 - 00		caudatum, Jacq	•••	721
້ ປ່າໃນ ດັກດີ		Chamrium, Ham		4
	96	Gandhium, Ham		Ā
maturaturate Min	96	giganteum, D. Don	••	3.
	88		•••	4
Roxburghii, Miq ,, sarmentosa, Miq ,,	83		•••	4
Sinihaa Min	85	No. No. of Assess of Page 1		3
Siriboa, Miq ,,	87	11. 14 11. (4. 100		4
sphærostachya, Miq "	96			3
Suipiqua, Miq ,,		laciniatum, Linn		14
sylvatica, Miq ,,	84	maritimum, Linn		4
syringæfolia, Miq ,,	96	murale, Linn		
thermalis, Miq ,,	96	nepalense, Hort. Monsp		3, 4
Thomsonii, C. DC ,,	87	opulifolium, Schrad	• • •	.3
Wallichii, Mig ,,	86	prostratum, Roxb	-	14
sp., Hk. f. & T v. 84,		purpurascens, Ham	• • •	.3
Cheilosandra leptopus, Griff. iv. 8	68	scoparium, Linn	• ,,	11

	-				
Chenopodium	Val	Page	Chionotria	V	ol. Page
minida Ilma		3	? rigida, Jack		i. 500
? vulpinum, Wall		3	Chirita, Ham	_	v. 355
vulpinum, Wall	"	5	acuminata, Br		,, 359
Cherleria grandiflora, D. Don		239	acuminata, A. DC		,, 349
juniperina, D. Don		239	bifolia, D. Don		,, 357
Chesneya, Lindl		117	brevipes, Clarke		,, 359
vaginalis, J. & S		117	caliginosa, Clarke		,, 360
Chickrassia, Juss		567	calva, Clarke		,, 358
Nimmonii, Grah		568	Clarkei, Hk. f		,, 359
tabularis, Juss		568	communis, Gardn	•••	,, 356
trilocularis, Roem		568	diaphana, Royle	•••	,, 357
velutina, Room		568	dimidiata, Br	•••	,, 357
Chiliandra obovata, Griff	•	374	Edgeworthni, A. DC	•••	,, 357
Chilmoria dodecandra, Ham	i.	195	flava, Br	•••	,, 357
Chilocalyx ellipticus, Turcz	. i.	513	glabra, Clarke	•••	,, 358
perfoliatus, Hassk	. v.	46	grandiflora, Wall	•••	,, 358
Chilocarpus, Bl	. iii.	626	Griffithii, Hk. f. & T.	•••	,, 344
atro-viridis, $Bl.$. ,,	626	hamosa, Br		,, 360
ceylanicus, Wight	. ,,	624	Hookeri, Clarke	•••	,, 359
cuspidatus, Benth	. ,,	629	Kurzii, Clarke	•••	,, 358
decipiens, Hk . f		627 ;	macrophylla, Wall	•••	,, 358
denudatus, Bl	. ,,	626	monophylla, Clarke		,, 360
enervis, Hk . f	. ,,	626	Moonii, Gardn	•••	,, 356
flavescens, Dyer	. ,,	625	primulacea, Clarke	•••	,, 360
Maingayi, Dyer	. ,,	627	paterion, as a son	•••	" 35 7
malabaricus, Bedd		626	urticæfolia, Ham		,, 358
Chilochloa arenaria, Beauv	. vii		Walkeri, Gardn	•••	" 35 6
aspera, Beauv	. ,,	237	Walkeriæ, Hook	•••	,, 356
Chiloschista, Lindl	. vi		zeylanica, Hook		,, 355
usneoides, Lindl	. ,,	37	sp., Hk. f. & T iv.	349, 3	52, 358,
usneoides, Wight		37	3 59, 360, 361.		. 100
Chimaphila, sp. Griff			Chironia centaurioides, R	oxb.	iv. 102
Chionachne barbata, Br	. Vi)		trinervis, Linn	•••	., 97
Koenigii, Thw		. 102	Chironies		iv. 94
Massii, Balans	٠,,	102	Chisocheton, Bl	•••	i. 550
Wightii, Munro		101	? costatus, Hiern		,, 552
Chionanthus albidiflora, Thw	. 111		divergens, Bl		" 551 " 551
axillaris, R. Br		608	dysoxylifolius, Kurz		, EEO
courtallensis, Bedd		609	erythrocarpus, Hiern		" 550 " 551
Ghæri, Gærtn		611	fragrans, Hiern	•••	″ 551
insignis, Miq		610	glomeratus, Hiern grandiflorus, Kurz		" KKO
intermedia, Bedd		609	1 5 1 1 Tr.		., 551
leprocarpa, Bedd		608 608	paniculatus, Hiern		
	•• ,,	610	penduliflorus, Planch.		i. 550
	,,		77		EEU
	,,	610 607	Chlaotrachelus, vide Cla		,, 550
	,,	610	chelus rupestris, Zol		iii. 2 34
minutiflora, Kurz montana, Bl		610	Chloothamnus chilians		
	• "	610	Buese		vii. 416
	•••	610	CHLOBANTHACEÆ		v. 99
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,,,	609	Chloranthus, Sw		v. 100
- , , , , , , , , , , , , , , , , , , ,	·· ,,	609	brachystachyus, Bl.	• •••	,, 100
		611	ceylanicus, Miq		" 100·
0 11 17 17 177 11		618	denticulatus, Cord		,, 100
and and a Time		608	elatior, Br		" 100
Chionotria monogyna, Wali		5 0 0	erectus, Sweet		" 100
Caroner as anonoggina, was					,,

Oblamathma		_	Chlorophotom			_
Chloranthus	-	Page 100	Chlorophytum			Page 883
	v.	100	Heynei, Baker		▼i.	334
inconspicuus, Swartz . indicus, Wight		100	khasianum, Hk. f laxiflorum, Baker	•••	"	336
	,,	100		•••	"	386
	,,	100	laxum, Br	•••	"	835
	ii. "6	. 283	malabaricum, Baker	vi. 9	94	
			nepalense, Baker Nimmonii, Dalz		vi.	336
		292	Orchidastrum, Lindl.			336
9 4 69 1	••	291		•••	**	336
·	,,	2 91	7.1	•••	"	334
compressa, DC		291	7. 1	•••	"	335
^~~1 mi.	,,	289	011. 1 TO	•••	" 1.	569
J No		291	D	•••		528
	•• ,,	292	Swietenia, DC	•••	"	569
delineania Mante		290			γi.	684
31 11 1 Oi 3	,,	290	Chondrilla, Linn		iii.	402
1, 1 17 11	,,	293	* 7 TEP- 11			405
1	,,	291	A A.J a. I.J XX7 = 11	•••	"	410
C110 1 D-1-	,,	299		•••	"	411
	,,	290	14 D' 1	•••	"	402
	,,	289	T 1 - 1 - 387 - 11	•••	"	408
maritima, Trin	,,	291	1 . ' - •	•••	"	402.
		293		•••	"	410
	,,	292	7	•••	"	405
~	,,	291	1 1 1 Thurs	•••	"	416
10°-1	"	296	11 5	•••	"	398
	,,	290	racemosa, Poir	•••	"	403
	. ,,	289	TET - 11	•••	"	395
•	,,	291	runcinata, Wall	•••	"	410
	,,	291	sagittata, Wall secunda, Royle	•••	"	416
	,,	293	setulosa, Clarke	•••	"	402
	,,	291		•••	"	410
	,,	292	, -	•••	"	402
The state of the s	,,	290	Sp Chondrospermum coriace		"	302
Dankan Oakala	"	292	}		iii.	618
73 . 1 7 7 77 7 7 7 7 7 7 7 7 7 7 7 7 7 7	,,	290	smilacifolium, Wall.			618
	,,	290	Chonemorpha, G. Don	•••	nii.	661
	,,	290	? antidysenterica, G. I	_		644
A. A. m	,,	291	? cristata, G. Don		"	66±
	•• ,,	291	dichotoma, G. Don	•••	"	604
4 ' 7 TT 1 4		291	? grandiflora, G. Don	•••	"	661
millana Daus	•••	291	Griffithii, Hk. f	•••	•••	662
1	"	291	macrophylla, G. Don	•••	"	661
727 7 1 1 1 7 77	"	293	malabarica, G. Don	•••	"	662
sp., Wall vii. 29:	,, 1 942		mollis, Miq		"	661
011 1 4 72	., 202 Vi.		vestita, G. Don	•••	"	662
	&	-	Choricarpa aphylla, Boe		٧i.	684
D		336	Choriophyllum, Benth.		٧.	343
	•••	336	malayanum, Benth	•••	,,	344
and minimum Dala		334	Choripetalum, A. DC.		iii.	515
	••	338	aurantiacum, A. DC.		,,	516
4. 4 70 7	•	335	undulatum, A. DC	•••	"	516
h		333	viridiforum, A. DC.	•••	"	516
h		333	sp., Griff		"	517
		336	Chorispora, DC	···	'n	166
-la		334	elegans, Camb		"	167
TT	,,	333	sabulosa, Camb	•••	"	167
	,,	400	,,,, , , , , , , , , , , ,	•••	**	

Chorispora	Vol.	Page	Chrysoglossum Vol. Page
sibirica, DC	i.	167	assamicum, Hk. f. v. 784, vi. 190
tenella, <i>DC</i>	"	166	erraticum, Hk. f. v. 784, vi. 190
Chorisandra pinnata, Wight	٧.	328	maculatum, Hk. f v. 784, 910
Chotekia (Chotellia) sericea,			vi. 190, 193
Opiz & Cords	iv.	689	villosum, Bl v. 783
CHRISTISONIA, Gardn	iv.	821	Chrysogonum, Linn iii. 802
albida, Thw	"	828	Arnottianum, Benth ,, 308
aurantiaca, Wight	"	322	heterophyllum, Benth ,, 803
bicolor, Gardn	"	322	Chrysophyllum, Linn iii. 535
calcarata, Wight	"	322	acuminatum, Roxb ,, 585
grandiflora, Gardn	. ,,	323	? molle, Wall , 547
Hookeri, Clarke	"	321	Roxburghii, G. Don ,, 535
Lawii, Wight	"	822	sumatranum, Miq ,, 535
neilgherrica, Gardn	"	322	Chrysopogon, Hack vii. 187
pallida, Gardn	"	322	aciculatus, Trin ,, 188
Stocksii, Hook	"	822	Arnottianus, Nees ,, 192
subacaulis, Gardn	"	321	asper, Heyne ,, 189
tricolor, Gardn	"	323	ciliolatus, Boiss ,, 193
tubulosa, Benth	"	821	coeruleus, Duthie , 198
? unicolor, Gardn	,,	823	Esenbeckii, Wight , 191
Christolea, Camb	i.	154	fuscus, Trin ,, 185
crassifolia, Camb	"	154	glabratus, Trin ,, 188
Chrosophora, Neck	▼.	408	glaucopsis, Duthie ,, 179
Burmanni, Spreng	"	409	Gryllus, Trin ,, 188
mollissima, Spreng	"	430	increscens, Nees ,, 193
obliqua, A. Juss	"	409	montanus, Duthie ,, 179
oblongifolia, A. Juss	"	409	montanus, Trin ,, 193
plicata, A. Juss	,,	409	muricatus, Wight ,, 242
plicata, Dalz	,,	410	pictus, Hance ,, 179
prostrata, Dalz	"	410	serrulatus, Str. & Wint ,, 198
Rottleri, A. Juss	"	409	serrulatus, Trin ,, 193
tinotoria, A. Juss	"	408	subulatus, Trin ,, 188
tinctoria, Muell	"	409	trivialis, Arn. & Nees ,, 188
verbascifolia, Boiss	"	409	velutinus, Arn ,, 194
Chrysanthellum, Rich	mi.	310	verticillatus, Trin ,, 189
indicum, DC	. "	310	villosulus, Nees ,, 179
Chrysanthemum, Linn	iii.	814	violascens, Trin ,, 179
Partemisiæfolium, Klatt	"	315	Wightianus, Nees ,, 191
Atkinsoni, Clarke	"	815	Wightianus, Thw ,, 192
coronarium, Linn	,,	314	zeylanicus, Thw ,, 192
cuneatum, Roxb	"	249	sp., Wall vii. 177, 188, 190,
Griffithi, Clarke	"	315	191, 192, 193, 194, 243.
indicum, Linn	"	814	Chrysosplenium, Linn ii. 400
Richteria, Benth	"	315	adoxoides, Maxim ,, 401
Rowburghii, Dest	"	314	alternifolium, Linn ,, 400
Stoliczkai, Clarke	"	814	carnosulum, Maxim ,, 401
tibeticum, Hk. f. & T	,;;	314	carnosum, Hk. f. & T ,, 400
Chrysobalanea arborescens, Br	22	822	Griffithii, Hk. f. & T ,, 401
Chrysobalanea	11.	807	lanuginosum, Hk. f. & T. ,, 401
Chrysobalanus Icaco, Linn	11.	307	nepalense, D. Don ,. 400
sp., Wall	"	318	sulcatum, Maxim ,, 400
Chrysobaphus Roxiurghii,		05	tenellum, Hk. f. & T ,, 401
Wall		95	trichospermum, Edgew, 400
Chrysocoma purpurea, Forst.		234 234	Chrysurus aureus, Beauv vii. 807
violacea, Schum	"		cynosuroides, Pers ,, 307
Chrysocysthus, Falc Chrysoglossum, Bl	i.	15 783	Chusquea amplopaniculata,
Chrysoglossum, Bl	₹.	100	Steud vii. 415

Vol. Pa	age	Cinnamomum	Vol.	
Cicca albiszioides, Kurz v. 2	89		▼.	130
4,00,000,000,000,000	05		,,	185
00000000 Did=00 111 111 //	88		. ,,	183
C100000000 222221111 100 111 17	04		,,	130
	89		,,	180
(L.),	05		,,	136
Leucopyrus, Kurz ,, 8	29	impressinervium, Meissn	b. ,,	129
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	90		,,	130
""" "" "" "" "" "" "" "" "" "" "" "" ""	88			180
	28		r. 132,	
periodital at all the second	28		v.	185
reticulata, Kurz ,, 2	88		,,	185
Cicendia fastigiata, Grisob. iv. 19	.00		,,	180
hyssopifolia, W. & A ,, 1	01		,,	188
microphylla, Edgew ,,	99			181
Rowburghii, Griseb ,, 1	00		v. 13 3 ,	
0.002, 200.000	76		▼.	180
G110012223, 2200000 111 111 ,,, =	76		,,	135
Jacquemontii, J. & S ,, 1	76	mollissimum, Hk. f.	,,	181
Lens, Willd ,, 1'	79	multiflorum, Wight	. ,,	132
	76		,,	185
numulariæfolium, Lamk ,,	66	niti dum, Bl	,,	130
soongaricum, Steph ,, 1	76		,,	128
OICHORIACE iii. 225, 3	91	ovalifolium, Wight	,,	133
Cichorium, Linn iii. 89	91	Parthenoxylon, Meissn	,1	135
Cosnia, Ham ,, 8	91	pauciflorum, Nees	,,	129
Endivia, Linn ,, 3	91	perpetuo-florens, Burm	,,,	132
Intybus, Linn ,, 8:	91	Perrottetii, Meissn	,,	134
Cicuta, Linn ii. 6	79	Pseudo-sassafras, Meissi	a. ,.	135
virosa, Linn ,, 6	79	recurvatum, Wight	,,	129
Cioutaria aquatica, Lamk ii. 6	79	sulphuratum, Nees	,,	132
Cimicifuga, Linn i.	29		,,	131
foetida, Linn ,,	30		,,	128
j. 19 1 au j. 100 j	30	tavoyanum, Meissn.		131
	35		r. 136,	142
graduction, it will the tree to	86		₹.	132
	82		,,	131
thyrsiflora, Roxb ,,	35	Wightii, Meissn	,,	132
Cinchoneze iii. 18,	34		. ,	181
Cinclidocarpus nitidus, Zoll.		Cionisaccus lanceolatus, Bree		111
& Mor ii. 2	57		. i.	545
	52		,,	545
	52		,,	545
	28	? subscandens, Miq	,,	545
	28		ii.	589
	32		,,	589
,,,	33		,,	589
	36	intermedia, Wall	,,	589
	34	lutetiana, Linn	,,	589
Cassia, $Bl.$,, 1	30	repens, Wall	,,	589
	28		▼.	100
Cathia, D. Don v. 136, 1			,,	101
	34		v.	772
Cecicodaphne, Meissa ,, 1	35		,,	779
citriodorum, Thw ,, 1	84	albidum, Wight	··_ ".	757
dubium, Wight ,, 1	32	Andersoni, Hk. f. v. 7	77, ▼ i.	190
dulce, Nees ,, 1	29	Andersonii, Kurz	T.	774

· ·			
Cirrhopetalum Vol. Page	A	Vol. I	Page
aureum, Hk. f. v. 777, vi. 190	377.11	i.	108
Blepharistes, Hk. f. v. 779, vi. 190		. ,,	104
bootanense, Griff v. 775		. ,,	104
brevipes, Hk. f. v. 777, vi. 190		,,	104
cespitosum, Wall v. 775		`,,	104
caudatum, Wight ,, 773		. ,,	104
Collettii, Hemsl ,, 773	discolor, DC	. ,,	103
concinnum, Hk. f vi. 190	discolor, Wall	,, .	104
cornutum, Lindl v. 774	dirersa, Miers	,,	104
elatum, Hk. j. v. 775, vi. 190	elata, Miers	,,	104
fimbriatum, Lindl v. 774	eriantha, Miers	,,	104
Gamblei, Hk . f . v. 778, vi. 190 gamosepalum, $Griff$. v. 774	glabra, Roxb	. ,,	103
gamosepalum, Griff v. 774	grallatoria, Miers	,,	104
grandiflorum, Wight, 773	hernandifolia, Wall	,,	104
guttulatum, Hk. f " 776	Laman difetia Willed	,,	103
lasiochilum, Hk. f ,, 772	hanandaa Dawh	,,	103
longescapum, Teys. & Binn. vi. 189	Lincoln Duch	,,	104
Macrael Lindl v 780 vi 190		••	102
Macraei, Lindl. v. 780, vi. 190 Macraei, Wight v. 777	- L44- VI/-11	••	104
	officinarum, Pluk., vide	,,	
75 11 771 4	/lanulus		105
76 1 71 11	-1 W7-11	,,	96
	I military I make Donah	,,	104
117:14 570	1	,,	105
nilgherrense, $Wight$, 778 ornatissimum, $Rchb.f.$, 773	Damaina Time	,,	103
ornatissimum, Acho. J ,, 175	Plukenetii, DC., vide	,,	100
parvulum, Hk. f. v. 778, vi. 190 picturatum, G. Lodd v. 774			105
picturatum, G. Lond v. 174	Cocculus	,,	105
Pumilio, Hk. f ,, 778	handana Mh.	,,	96
refractum, Zoll " 779		,,	10 1
retusiusculum, Rchb. f , 776	Wightianus, Wall., vide		105
Roxburghii, Linat. V. 774, Vi. 190		;	105
Roxburghii, Lindl. v. 774, vi. 190 simillimum, Rehb. f v. 775 tæniophyllum, Hk. f , 780		1.	654
The man in the second s	1	,,	654
Thomsoni, Hk. f. v. 778, vi. 190		,,	648 663
Thwaitesii, Relib.f v. 777	_ Ji Ti1.	,,	649
modern Linds = 772 vi 190	unantain Tamb	"	649
tripudians, Par. & Rohb. f. ,, 779 vaginatum, Lindl. v. 773, vi. 189 viridiflorum, Hk. f. v. 779, vi. 190	ananatitalia Damb	,,	654
Walkerianum, Wight v. 780	337-11	·· "	648
	70	,, iii.	619
,		•	654
	cantoniensis, Ilk. & Ari		663
Wallichii, Lindl ,, 779		.,	659
Wightii, Thw ,, 777 Cirsium argyracanthum, DC. iii. 362	capreolata, Royle	,,	654
manus and the way Winks 201		,,	654
aminus Soon 969		,, i. 646,	
hataumallum Samana 979			649
	37-1-1	i.	654
involucratum, DC ,, 362	Y17-11	,,	660
lyratum, Bunge ,, 373 macracanthum, Sch. Bip. ,, 364	1 1/21 101	,,	
nacracanthum, Sch. Bip. ,, 364 nepalense. DC 364	71 10 11 357 1	,,	647 663
	1 1 1 1	,,	645
sinensis, Clarke	7 7 7	,,	658
#		", i. 655,	
Wallichii, DC iii. 363, 364		i.	656
			649
Cissampelopsis volubilis, Miq. iii. 351	mlanna Mham	,,	647
Creatingetopers voluntees, mid. III. Oot	gtauca, Thw	,,	J

Cissus	V ol	Page	Citrus		7	Tol.	Page
	v.	645	Limetta, DO	•••	•••	ii.	
hastata, Miq	,,	645	Limetta, Risso	•••	• • • •	,,	515
heptaphylla, Retz	,,	662	Limonellus, Wall.	•••	•••	17	515
heterophylla, Herb. Mad	r. "	658	Limonum, Wall.	•••	•••	,,	515
himalayana, Walp	,,	656	Lumia, Risso	•••		,,	515
involucrata, Spreng	,,	664	medica, Linn	•••		,,	514
japonica, Willd	,,	660	medica, Willd		• • •	"	515
Kleinii, Wall	,,	649	Papeda, Miq	•••		,,	515
lanceolaria, Roxb	,,	660	scandens, Griff	•••	• • •	,,	510
latifolia, Vahl	,,	649	vulgaris, Risso			"	515
1. 1 1 11. 700	,,	646	Claderia, Hk. f		810,	νi.	178
muricata, Dalz. & Gibs		660	viridiflora, Hk . f .	٧.	810,	٧i.	191
D.CI	,,	659	Cladium, Br			vi.	673
. 1 To . 10 . 12 . T 1.	,,	654	germanicum, Schra	d.		,,	674
1 4 1 1	,,	662	glomeratum, Br.	•••		,,	675
The 16	,,	646	jamaicense, Órantz	•••		"	674
pentaphylla, Herb. Mad		649	Maingayi, Clarke	•••		"	674
? porphyrophylla, Lindl		96	Marisous, Br			,,	6 73
	i.	648	riparium, Benth.	•••	•••	"	674
The state of the s	. ,	645	undulatum, Thw.			"	674
7 77-1-1	,,	648	Cladosperma, Griff.			νi.	411
	,,	647	Cladostachys alterni	folic			
	,,	648	Sweet	•••		iv.	718
and an Inda Mhan	,,	655	frutescens, D. Don			,,	714
		649	muricata, Moq	•••			718
mile de Transa		647	Claotrachelus (Chlaotr			"	
a annualitation Desail		662	rupestris, Zoll.			iii.	234
n n n	•••	659	Claoxylon, A. Juss.	•••		٧.	410
4 Th - 1	,,	654	anomalum, Hk. f.		•••		412
(1 - 1 AT	,,	650	Beddomei, Hk. f.	•••	•••	"	413
70 11 TY	,,	660	digynum, Wight	•••	•••	"	453
	,,	654		•••	•••	"	413
	,,	653	hirsutum, Hk. f. indicum, Hassk.	•••	•••	"	410
	,,	660		•••	•••	"	411
	,,	656	khasianum, Hk. f.	•••	•••	"	413
	,,	647	leucocarpum, Kurz		•••	"	411
velutinus, Lindl	,,	649	longifolium, Muell	•	•••	"	412
	,,		longifolium, Baill.		•••	"	413
		, 651	longipetiolatum, K		•••	"	
	i.	663	macrophyllum, Has		•••	"	410 412
Cistanche, Hoffm. & Lin		323	Mercurialis, Thw.		•••	"	
	,,	324	muricatum, Wight		•••	"	436
	,,	324	oligandrum, Muell.		•••	"	412
	vi.	18	parviflorum, Hook.		ro.	37	410
Citheris, vide Cytheris.		000	spiciflorum, Baill.	;;-	•••	"	410
	ii.	62 0	Wallichianum, Mu	ell.	•••	"	411
	,,	620	Wightii, Hk. f	•••	•••	"	418
	,,	621	sp. v. 13, 14, 15,	•••	•••	"	414
	,,	621	sp., Hk. f. & T.	•••	•••	▼.	438
	1.	514	Clarkella, Hk. f	•••	•••	iii.	46
	,,	515	nana, Hk. f	•••	•••	"	46
	,,	515	Clausena, Burm	•••	•••	i.	503
buwifolia, Poir	,,	515	excavata, Burm.	•••	•••	"	504
	,,	516	heptaphylla, W. §	A.	•••	**	504
	,,	515	indica, Oliv	•••		,,	505
inermis, Roxb	,,	514	macrophylla, Hk.		•••	"	504
japonica, Thunb	,,	514	nana, W. & A	•••	•••	,,	506
latines. Hk. f. & T.		515	mandambella DO				503

Clausena	Vol.	Page	Cleistanthus		Vol.	Page
pubescens, W. & A	i.	506	Helferi, <i>Hk. f.</i>		iii.	280
	,,	498	heterophyllus, Hk. f.		"	276
	,,	506	hirsutulus, Hk. f		"	278
TTT 181 1 11 A71	, ,,	505	lævis, Hk. f		"	277
TTT 1 (All	,,	505	lanceolatus, Hk. f		"	275
TET 211 3 22 TOT 0. A	. ,,	506	lancifolius, Hk. f	•••	"	277
	iï.	487	macrophyllus, Hk. f.	•••	"	278
751	,,	480	Maingayi, Hk. f	•••	"	280
. 500	,,	480	malabaricus, Muell.			276
Clavulium pedunculosur			malaccensis, Hk. f	•••	٧.	277
<u> </u>	ii.	84	membranaceus, Hk. f.		"	278
Cleghornia acuminata, Wigh		663	myrianthus, Kurz	•••	"	275
cymosa, Wight		663	nitidus, Hk. f	•••	"	280
	".	444	oblongifolius, Brand.	•••	"	275
* * ·	., ,,	444	oblongifolius, Muell.		2.,9.	282
* 1. 1. 2 mm		444	pallidus, Muell		v.	279
	 vi. 71		parvifolius, Hk. f		,,	281
	vi.	62	patulus, Muelh			279
777 6		71	pedicellatus, Hk. f	•••	"	281
1.1 ! 1 - 4 TTL - E	,,	75	podocarpus, Hk. f	•••	"	281
	,,	73	robustus, Muell		"	279
h	,,	73	stenophyllus, Kurz	•••	"	275
	,,	74	-411- 17:-11	•••	"	282
	•• ,,	72	stipulatus, Hk. f	•••	"	281
Dawsonianum, Rohb. f.	,,	43	l 1 ⁻ 1 m. 1	•••	12	279
Acaiminus Timil		75	TX7-11	•••	"	282
discolor Timdl	•• ,,	75	A	•••	" 1.	1
	•• ,,	71		•••	i.	2
	•• ,,	71	acuminata, DC	•••		ธ์
7	,,	60	acutangula, Hk. f. & T.	•••	"	3
	,,	71	albida, Klotz		"	5
	,,	76	amplexicaulis, Edgew.	•••	"	6
	• • * * * * * * * * * * * * * * * * * *	71	anemoniflora, D. Don	•••	"	2
maculosum, Lindl	,,	75	apiculata, Hk. f. & T.	•••	"	4
	,,	74	barbellata, Edgew	•••	"	3
	•• ,,	72	Buchananiana, DC.	•••	"	6
	,,	72	Buchananiana, Wall.	•••	"	6
	,,	70		•••	"	2
	,,	73	Cadmia, Ham cana, Wall	•••	"	4
Minney and a serious serious Mariana	,,	75		•••	"	6
	,,	74	comosa, DC	•••	"	6
1 . 10 TTL 4	,,	74		•••	"	5
	• •	74	1.1.111	•••	"	5
Wendlandorum, Rchb. f		162	diio D	•••	"	4
	V 11.	168	12 12 27 2	•••	"	6
	,,	162		•••	"	3
	•• "	102	T	•••	"	4
Cleistanthium nepalense,	442	900	7 77 1	•••	"	
AL 1		890 274	graveolens, Hook	•••	"	5 6
	▼.		grewiæflora, DC	•••	"	6
- L 4n	. ,,	276	grossa, Wall	•••	**	
chartaceus, Muell	,,,	275	hedysarifolia, DC	•••	"	4
chartaceus, Muell ii	i. 281,	404 974	ispahanica, Boiss	•••	"	5
	iii.		javana, DO	•••	"	4
	,,	278	loasæfolia, DC	•••	"	6
elliptions, Hk. f.		281	loasifolia, D. Don	•••	"	ę
ferrugineus, Muell		280	longicaudatu, Ledeb.	•••	"	5
gracilis, Hk. f	,,	277	montana, Ham	•••	"	2

Clematis	Vol	. Page	Clerodendron		Page
montana, D. Don	i.	2	calamitosum, Linn	i▼.	591
Munroana, Wight	,,	3	calycinum, Tarcz	,,	594
napaulensis, $ar{DC}$,,	2	canescens, Wall	,,	589
nepaulensis, Royle	,,	3	castaneæfolium, Klotz	. ,,	594
nutans, Royle	,,	5	Colebrookianum, Walp.	,,	594
orientalis, Linn	,,	5	cordatum, D. Don	,,	594
parvifolia, Edgew	,,	5	coromandelianum, Spren		596
parvifolia, Hk. f. & T.	,,	4	// // // // // // // // // // // // //	,,	592
puberula, Hk. f. & T.	,,	4	J. A	,,	593
punduana, Wall	∵",	2	1 Jan4-4 Wali	,,	593
scabiosæfolia, DC	••• ,,	6	1 12 10-12 101	. ,,	589
smilacifolia, Wall	••• ,,	3	1 20 1	,,	592
smilacina, Bl	••• ,,	3	317.31	. ,,	592
subpeltata, Wall	••• ,,	3	C Dance	. ,,	595
sulcata, Wall :	••• ,,	2		, 596,	597
4. 'A ?' Th1-	,,	5	1	iv.	
tortuosa, Wall		6	787 - 11		596
4-11-h- 11	,,	` š	TT'A		589
73.7	***);	6	1 7 7 7 7 327 - 11		594
	••• ,,	6	17		597
''' DO	••• ,,	ő	317-11	. 11	597
	••• ,,	6	1	•• ••	590
	••• ,,	. 5			595
	;,	168	hastatum, Lindl		592
Cleome, Linn	10		herbaceum, Wall		589
J	,,	169	inerme, Gærtn	. ,,	589
	,,	169	inerme, Bonth	• • • • • • • • • • • • • • • • • • • •	
	,,	169	infortunatum, Gærtn	,,	594
	,,	170	Jackianum, Wall javanicum, Walp	. ,,	590
	,,	170	javanicum, Walp	* 77	592
	,,	170		. 17	594
cordata, DC	,,	168	Leucosceptrum, D. Don	. ,,	699
diffusa, Roxb	,,	169		. ,,	598
diversifolia, Hochst.	,	169	Lobbii, Clarke	. ,,	590
felina, Linn	,,	170	macrophyllum, Sims	. ,,	592
fruticosa, Linn	,,	172	macrostachyum, Turcz	. ,,	591
gracilis, Edgew	,,	168	molle, Jack	. ,,	595
L 1 11 T !	,,	168	neriifolium, Wall	. , ,,	589
	,,	170	Lutans, Wall		591
	•••	168	ornatum, Wall	• • • • • • • • • • • • • • • • • • • •	592
	,,	169	ovatum, Poir		596
Noëana (Noreana), Bois		168	paniculatum, Linn		593
mamilloon Stead		168	penduliflorum, Wall		591
		171	phlomoides, Linn. f		590
aminamannia DO	•	168	1 1 - A - A - A - A - A - A - A - A - A	. ,,	598
ח ו י מ ו ו	,,	169	sagittatum, Wall		596
simplicifolia, Hk. f. &	π. ,	169	semiserratum, Wall		595
	••	169	327-13		596
	,,	169	107-11	2	419
	,,	169		2	592
Vahliana, Fres	,,		serratum, Spreng		595
Ma = a = a = '	į,	170	Siphonanthus, Br	• •	593
	,1.	168	splendidum, Wall	••	
	iv.		squamatum, Vahl		593
aculeatum, Linn	,,	589	ternifolium, D. Don		592 505
acuminatum, Wall bracteatum, Wall	,,	589		. ,,	595
bracteatum, Wall	,,	593	·	,,	595
Buchanani, Roxb	,,	596		. ,,	592
Buchanani, Wall	,,	596	vertillatum, D. Don	. ,,	59 5

Olerodendron	Vol.	Page	Cluytia		Vol.	Page
villosum, Bl	i₹.	5 95	spinosa, Willd	·	٧.	268
viscosum, Vent		594	stipularis, Linn.	·	,,	270
80. Griff		598	an. Wall		"	269
sp., Griff iv. 580,	591.	592	Clypea Burmanni, W	TAL A.	í.	104
Clethropsis nepulensis, Spach		600	hernandifolia, W. d	. W 11.		103
		600	Wichtii Ann	• д	"	103
nitida, Spach	:*	283	Wightii, Arn Cnemidia angulosa,	12-21	_;"	92
Cleyera, DC	1,		Chemiais angulosa,	Linai.		
emarginata, Gardn	"	281	bambusæfolia, Thw	•	"	94
grandiflora, Hk. f. & T	77	284	curculigoides, Thw	., vide		
grandiflora, Chois	"	284	Tropidia		"	94
grandiflora, Wall. i. 281,	282	, 284	semilibera, Lindl.		,,	92
gymnanthera, W. & A	j.	281	Cnemidostachys Che	ımælea,		
japonica, Sieb. & Zucc	,,	284	Spreng		v.	475
japonica, Thunb	"	280	linearifolia, Miq.		,,	475
lasiopetala, Wight		283	Cnesmone, Bl		٧.	466
7 1. A.D.		284	javanica, Bl			166
	"	283			ij.	46
	"	284	Crestin Luce			54
ochnoides, G. Don	"		Cnestis, Juss	•••	ii.	
pentapetala, Spreng	"	287	acuminata, Wall.		79	48
Wallichiana, Sieb. & Zncc.	٠,	284	flaminea, Griff	•••	"	54
Climacandra littoralis, Kurz	īii.	1	foliolosa, Planch.		"	54
multiflora, Miq	"	580	ignea, Planch		,,	54
obovata. Miq	"	530	monadelpha, Rozb.		"	47
Clinacanthus, Nees	iv.	524	platantha, Griff.		11	54
Burmanni, Nees	72	524	ramiflora, Griff.		"	54
Clinogyne, Salisb	vi.	257	stenopetala, Griff.		"	49
dichotoma, Salisb	"	258	vestita, Wall			47
grandis, Benth		258	Cnious, Linn		iïi.	362
ulamaka Daukh	"	258	angustifolius, Wall.			382
Clinopodium longicaule, Bth.	'n.		arachnoides, Wall.		"	364
	34.	651			"	362
repens, Roxb	"		argyracanthus, Cla		77	862
vulgare, Linn	"	650	arvensis, Hoffm.	;;;	***	
Clintonia, Rafin	¥i.	861	candicans, Wall.			373
alpina, Kunth	"	361	carlinoides, Cass.	•••	111.	368
udensis, Fisch. & Mey	. 22	861	carthamoides, Wall.		"	873
Clitoria, Linn	11.	208	cernuus, Wall		,,	364
acuminata, Grah	77	208	eriophoroides, Hk .	f	"	363
biflors, Dalz	"	208	eriophorus, Hk. f. &	: T	,,	363
cajanæfolia, Benth	,,,	209	Falconeri, Hk. f.		,,	363
Grahami, Steud	"	208	Griffithii, Hk , f .		"	363
macrophylla, Wall	"	209	horridus, Clarke		,,	363
mariana, Linn	"	208	involucratus, Wall.			362
menicana, Link	"	208	niveus, Wall		"	875
pilosula, Wall		208	sinensis, Clarke		"	864
Tornatea, Linn	٠,	208	Verutus, D. Don		"	363
A1	"	882	Wallichii, Hk. f.	•	"	863
	v.	275	Wallichii, Clarke	•••	77	364
collina, Roxb	"				."	
montana, Roxh	77	269	Cnidium cuneatum,		ii.	704
oblongifolia, Ruxb	>9	275	diffueum, DC	 Di	,"	693
patula, Roxb	>>	279	Cobamba dichotoma,		i₹.	103
patula, Wight	>>	275	Cobrecia laza, Nees		٧i.	698
retusa, Linn	"	268	Coccinia indica, W. &		ii.	621
retusa, Moon	"	269	Wightiana, Rosm.		"	621
retusa, Wight	1)	275	Coccoceras, Miq		Ÿ.	424
scandens, Roxb	"	270	muticum, Muell.		"	484
sempersorens, Roxb	"	897	pedicellatum, Hk. f		"	424
semperstorens, Wall	"	418	plicatum, Muell.		ù	424
• • • • • • • • • • • • • • • • • • • •	••				•	

	37.01	Page	1	57-1	D
Coccoloba crispata, Ham	_	45	Cochlianthus, Benth		Page 192
andan atum Damb		52	Composition Dansell		198
Make as 17 am		50	Cochlospormer V	- 7	18:
Canana	•	95	Closermin DO		190
A DA	•	101			405
annuminatus DO		99	Cocon Finn		
Anistalaskin DO			Cocos, Linn	. v i.	482
Aristolochiæ, DC	, ,,	101	nana. Griff	. ,,	488
Blumeanus, Wall	, ,,	99	nucifera, Linn		482
Burmanni, DC	, ,,	104	Codariocalys conicus, Hussk.	ii.	175
calophyllus, Wall	* **	578	gyrans, Hassk	. ,,	174
convolvulaceus, DC	. ,,	97	gyroides, Hasak	. ,,	175
cordifolius, DC	. ,,	97	Codimum, Juss	. v.	399
crispus, DC	,,,	96	andamanicum, Kurz	. ,,	403
cuspidatus, Wall	. ,,	100	? lutescens, Kurz	. "	477
Fibraurea, DC	- 23	98	pictum, Hook		899
Finlaysonianus, Wall	22	103	umbellatum, Muell		402
glaber, W. & A	"	102	variegatum, Bl		399
hastatus, DC		101	Codonacenthus, Nees	•	500
incanus, Colebr	"	102	acuminatus, Nees		501
lacunosus, DO	"	98	pauciflorus, Nees		500
lævis, Wall		102	Codonopsis, Wall		480
laurifolius, DC	"	101	affinis, Hk. f. § T		431
Leseba, DC	"	102	albifora, Griff		486
longa, vide Stephania	"	103	1 10 Albanis 1771 / 92 //1	•••	482
lucidus, Teysm. & Binn	"	106			436
TT 0. 4	"	101	1 4 6 6 1		433
malabaniana DO	"	96			436
manchum manus Wall	"	104	Romanna III. C Sa III	4	433
	"	102			430
ahlamana 107-11	"	100	C = 100 +1 (1).		431
- 47 111 - 1 - 1	"	105		•••	436
TO THE TOTAL TOTAL STATE OF THE	"	104	lanasanna Wi	••	436
	"	104	D	**	433
11 7 1 900 99	"	97			436
petiolaris, Wall planiflorus, Wall. (error for	"	01	1		431
		106			400
	"	99	subsimplex. Hk. f. & T		432
	"	98	thaliotrifolia, Wall iii.		
71.4	"	99			436
	"	102			431
Dantanak /aman Mr. W	"	103			
contam Coloba	"	101	Coelachne, Br	431,	970
sepium, Colebr	"	98	Voelachne, Br	vii.	271
suberosus, DO	"	1 1 1	brachiata, Munro brachiata, Trim	"	271
tomentosus, Colebr	"	96 100	J		271
triandrus, Colebr	"	100	infirma, Buese		271
velutinus, Wall	:"04		madagascariensis, Baker	••	271
verrucosus, Wall		3, 97	perpusilla, Thw		270
villosus, DC villosus, Wall	i.	101	pulchella, Br		
	77	104	pulchella, Thw		271
Wightianus, Wall. (lapsu		105	simpliciuscula, Munro Ooelachyrum, Nees vii.	200	271
Cissampelos)	;>	105	Coolachyrum, Nees vii.	100	401
Joohlearia, Linn	1.	145	Coelarthron, Hk. f vii.		
altaica	77	145		vii.	419
alyssoides, DC	"	145 145		• ▼.	419
flava, Ham	"	145	calycinum, Bedd ferrugineum, Hk. f		420
himalaice, Hk. f. & T	**	145	forrugineum, Hk. f		420
scapiflora, Hk. f. & T	22	TIG !	? longifolium, Hk. f	79	34V

	1.0.1	
Cœlodepas Vol. Pa	Cœlogyne	Vol.: Page
Wallichianum, Benth v. 4		v. 844
Coolodiscus, Baill v. 4		l ,, 833
eriocarpoides, Kurz ,, 4		,, 830
glabriusculus, Kurz ,, 4	Gardneriana, Li	ndl. v. 828, vi. 193
hirentulus, Kurz ,, 4	glandulosa, Lind	l v. 835
lappaceus, Kurz ,, 4	Goweri, Rchb. f.	" 843
longipes, Kurz " 4		.& Rchb. f. " 831
montanus, Muell ,, 4:	(romuni, Ak. j.	v. 838, vi. 194
speciosus, Muell ,, 4	Hookeriana, Lin	<i>ll.</i> v. 812, vi. 194
Thunbergianus, Muell ,, 45	humilis, Lindl	. v. 810, vi. 194
Cæloglossum acuminatum,	Hüttneriana, Rc	h <i>b. f.</i> v . 830
Caloglossum acuminatum, Lindl vi. 10		f "846
brevifolium, Lindl vi. 157, 16	Lhaoiana Robb	914
cernuum, Rohb. f vi. 18	lactea, Rchb. f	7, 843 v. 841, vi. 194 ll. v. 830, vi. 193 c. f vi. 194
densum, Lindl ,, 16 lacertiferum, Lindl ,, 16	lagenaria, Lindl.	v. 841, vi. 194
lacertiferum, Lindl ,, 16	lentiginosa, Lind	l. v. 830, vi. 193
luteum, Dalz " 18	longibractata, Hi	. f vi. 194
Mannii, Rchb. f " 16	TOURTPOR, Delicut.	7. 000
peristyloides, Rohb.f " 11	Longii Lindl	836
secundum, Lindl , 16	Plutea, Par	, 843
Cœlogyne, Lindl v. 82	macrobulbon, Hk	. f 830
alba. Rehb. f 84	maculata, Lindl.	v. 841, vi. 194
alba, Rchb. f , 84 anceps, Hk. f v. 840, vi. 19	Maingavi, Hk. f.	v. 841, vi. 194 v. 831, vi. 194
angustifolia, A. Rich v. 83	Massangeana, R.	hb. f v. 830
angustifolia. Wight 83	1	vi. 193
aniculata, Par. & Robb. f 78	micrantha, Lind	. v. 836, vi. 194
Arthuriana, Robb. f vi. 19	nervosa, A. Rich.	
apiculata, Par. & Rohb. f. ,, 78 Arthuriana, Rohb. f vi. 19 articulata, Rohb. f v. 54 arrenta Lindl. v. 835 vi. 19	nervosa, Wight	225
asporats, Lindl. v. 835, vi. 19 assamica, Lindl v. 83 barbata, Griff. v. 839, vi. 19	nitida, Lindl.	7. 837, vi. 187, 194 v. 832, vi. 194 v. 837, vi. 194 v. 837
assamica, Lindl v. 83	occultata, Hk. f.	v. 832, vi. 194
barbata, Griff v. 839, vi. 19	ocellata, Lindl.	v. 837, vi. 194
birmanica, Rohb. f. (lapsu	ochracea, Lindl.	v. 831
Pleione) v. 840. vi. 19	odoratissima, Lin	
brachyptera, Rchb. f v. 84	ovalis, Lindl	,, 836
breviscapa, Linal ,, oo	pallida, Robb. f.	,, 840
brumea, Lindl ,, 83	pandurata, Lindl	v. 835, vi. 194
calceata, Rchb. 1, ,, 84	papagena, Rchb.	v. 886
candida, Lindl ,, 84 carnea, Hk. f v. 838, vi. 19 caulescens, Griff v. 84	Parishii, Hook	,, 837
carnea, Hk. f v. 838, vi. 19	parviflora, Lindl.	,, 783
caulescens, Griff v. 84	P pilosissima, Pla	nch , 836
conferta, Par. & Rohb. I , 83	plantaginea, Line	<i>ll</i> ,, 843
Convallaria, Kond. I , 04	porrecta, Rohb. f.	544
corniculata, Rchb. f 84	præcox, Lindl.	v. 840, vi. 194
corniculata, Rchb. f , 84 coronaria, Lindl , 82 corrugata, Wight , 83 corymbosa, Lindl. v. 831, vi. 19	præcox, Lindl. prolifera, Lindl.	▼. 838
corrngata, Wight ,, 83	punctulata, Lindl ? purpurascens, I	,, 837
corymbosa, Lindl. v. 831, vi. 19	? purpurascens, I	$lk. f. \ldots , 842$
Cristata, Lindl v. 829, vi. 19 Cumingii, Lindl v. 83		vi. 195
Cumingii, Lindl v. 83	recurva, Rohb. f.	v. 845
cycnoches, Par. & Rchb. f. " 83	Reichenbachiana	, T. Moore , 841
vi. 19		
elata, Lindl v. 838, vi. 19	rigida, Par. & Rel	10, J V. 839
fimbriata, Lindl v. 83	Rossiana, Rchb. f.	v. 843, v1. 193, 195
fimbriata, Lindl ,, 83	rubra, Walp salmonicolor, Rohl	v. 847
flacoids, Lindl ,, 82	salmonicolor, Rohl), I, , V1. 194
flavida, Wall ,, 83	Schillerians, Rchi	D. J. V. 834, VI. 194
Ravida, Hk. f ,, 83	speciosa, $Lindl$. stenochila, Hk . f .	V. 55±, V1. 194
fuliginosa, Lindl " 83	stenochiia, Hk. j.	▼. 557, ¥1. 194

Cœlogyne	V ol.	Page	Coix	Vol	Page
	v.	832		vii.	100
	,,	833	J I O. 19 . L	,,	100
testaces, Lindl	,,	829		,,	100
	30, vi.	193		,,	100
	37, vi.	194	stigmatosa, Koch & Bouc		100
trifida, Rohb. f	▼.	835	sulcata, Rottl	,,	102
trinervis, Lindl	,,	8:12	tubulosa, Hack	,,	100
? triplicatula, Rohb. f.	,,	836	Colbertia, Salisb	i.	37
trisaccata, Griff	,,	829	augusta, Wall	,,	38
undulata, Wall	,,	832	1 1.12 100	,,	38
undulata, Walp	,,	847	Acaribana da Wall	,,	38
? uniflora, Lindl	,,	8 42	obovata, Bl	,,	37
ustulata, Par. & Rchb. f.	,,	840		vi.	3 01
viscosa, Rchb. f	,,	832	Colchicum, Linn	Vi.	356
Wallichiana, Lindl		840	luteum, $Baker$,,	356
sp., Griff v. 8	37, 838,	841		iv.	144
Cælorachis hirsuta, Brongs	ı. Vii.	162		,,	144
muricata, Brongn	,,	157		iv.	642
A 1	jii.	159	oppositifolia, Sm	,,	642
paniculatum, F. Muell.		160		,,	643
	,,	16 0	4	,	642
1 707	,,	159	Colebrookia, Donn	. V1.	
Colostegia, Benth	i.	352	bulbifera, Roxb	,,	206
	,,	353		iv.	624
~ ~ ~ . '	iii.	153		,,	625
7 4 . 1	,,	106	nana Alama Dandh	,,	625
, , , , , , , , , , , , , , , , , , , ,	,,	153		,,	626
1 . 'a Di	,,	155	hankana Danii	,,	625
A 11" M1	,,	107	T 17 1	,,	626
A	••• ,,	154		. ,,	625
7, 7, 777, 74	,,	106		,,	623
· · · · · · · · · · · · · · · ·	,,	153	7.1	,,	622
		155		. ,,	624
	••• ,,	154	1-4-4 T) 12	,,	626
	••• ,,	155	7/	•• ,,	626
7 D		159		. ,	626
travancorensis, W. & A.	••• ,,	154	77 70	., ,,	626
		154	n . 11	,,	626
TTT 1 TTT 0. A		154		•• ,,	622
TTI A L M	••• ,,	154	.0	,,	625
sp., Wall i	 ii. 154,		9	•• ,,	624
A	vii.	99	0.11	•• ,,	625
	••• ,,	100	**************************************	,,	626
Ata- Dank	• •	100			624
•		102	0 4 1	,,	625
		100	4 1 10 2 1 13 1	,,	623
	-	102	TIT 11 ' TO 41	•• ,,	626
		102	9872 - 1 4 12 13 Al-	,,	622
		100	Zatarhendi, Dalz. & Gib	B. "	624
evaltata, Jacq	," ii, 100,	1	Collabium. Bl. v 7	84. vi	178
	v ii.		Collabium, Bl v. 7 nebulosum, Bl	,	785
		101	simplex, Robb. f.		785
	,,	102	simplex, Rohb. f Wrayi, Hk. fv. 7	84. vi	196
	••• ,,	100	Colladoa distachya, Cav	vii.	128
	ii. 1 0 0,		Collasa cinerascens, Grah	ii	213
	11. 100, vii.		gibba, Grah ii	217	218
		100		. – ;;,	213
Mauuen. Roman	• • • • • • • • • • • • • • • • • • • •	100	movie, Gran		-10

Collaca		Page	Columnea		Page
	. ii.	212	diffusa, Roxb	. iv.	277
	. ,,	217	heterophylla, Roxb	. ,,	270
Collyris major, Vahl	.iv. 50		longifolia, Linn	. ,,	274
minor, Vahl			minuta, Roxb	. ,,	281
Coloorsia, Linn	. vi,	523	tomentosa, Roxb	- 11	259
acris, Schott	. ,,	523	Colutes, Linn	. ii.	103
affinis, Schott	. ,,	523	arborescens, Linn	. ,,	103
Antiquorum, Schott	. ,,	523	nepalensis, Sims		103
cochleata, Miq	. ,,	525	Comarum flavum, Roxb	. ii.	359
cucullata, Schott	. ,,	525	Salessovii, Bunge		348
esculenta, Schott		523	Combesia abyssinica, A. Rich		412
euchlora, C. Koch & Lind	• ,,	523	COMBRETACEE		443
fallux, Schott	. ,,	524	COMBRETEÆ		443
Fontanesii, Schott	. ,,	523	Combretum, Linn	. ii.	452
? fornicata, Kunth	. ,,	526	aculeatum, Vent	. ,,	453
gigantes, Hk . f	. ,,	524	acuminatum, Rowb	. ,,	455
indica, Engl		524	albidum, G. Don	. ,,	458
indiea, Kunth		525	apetalum, $Wall$. ,,	453
macrorrhiza, Schott		526	attenuatum, Wall	. ,,	45R
Mannii, $Hk. f$		524	chinense, Rozb	. ,,	457
? montana, Kunth		525	costatum, Roxb	. ,,	455
mucronata, Kunth		52 6	dasystachyum, Kurz	. ,,	457
navicularis, Koch & Bouch		527	decandrum, Rosb	. ,,	452
nymphæifolia, Kunth	•••	5 23	elegans, Wall		454
odora, Brongu		526	extensum, Roxb		458
odorata, Hook		526	flagrocarpum, Herb. Calc		455
pruinipes, Koch		523	formosum, Griff	. "	458
P pumila, Kunth	,,	522	Griffithii, Heurok & Muell		457
rapiformis, Kunth		525	Heyneanum, Wall		458
rugosa, Kunth		525	Horsfieldii, Miq	. "	458
virose, Kunth	•••	524		. ,,	458
vivipara, Thw		522	insigne, Heurok & Muell lætum, Wall	. ,,	453
Wendlandii, Engl	••	524	latifolium, Bl		458
sp., Hk. f. & T	••	523	lavum, Roxb		458
sp., Wall vi. 523		527	lepidotum, Presl	•••	456
COLOCASIEZ	_, .	491	leucanthum, . Heurck		
Colpodium, Trip vii. 311			Muell		458
	. vii.		lucidum, Bl		454
nutans, Griseb		312	macrostachyum, Wall	•••	458
subspicatum, Hack	•••	311	malulæa, Wall		456
Colpopodeum, sp. Wall		299	nanum, Ham	••	457
Colquhounia, Wall	. iv.		neurophyllum, ? Miq	•••	455
coccines, Wall		674		. 453	
elegans, Wall		674	ovalifolium, Rozb		458
tenuiflors, Hk. f	•••	674	pilosum, Roxb		453
tomentosa, Houllet		674	platyphyllum, Heurck	. "	
vestita, Wall	• • • • • • • • • • • • • • • • • • • •	674	Muell	. ,,	458
sp., Clarke		700	Porterianum, Wall	• "	457
Colubrina, Rich	•	642	pyrifolium, Kurz	•	453
asiatica, Brongn		642	quadrangulare, Kurz		456
javanica, Miq	-	642	rotundifolium, Roxb	••	458
t	••	642	Roxburghii, G. Don		458
travancorica, Bedd		643	Roxburghii, Spreng		452
Columbia, Pers	•	393		••	455
floribunda, Wall		393	semi-adnatum, Heurck		
merguensis, Planch		394	76 77		459
Columnea balsamea, Rozb		271	387.11		450
Committee Calcalineous Man C. I.	• • • •		sericeum, waii	"	200

Combretum	Vol	. Page	Commelina		Wal	Page
spinescens, Wall			ensifolia, Br		vi.	
squamosum, Rosb		456	ensifolia, F. Muell			373
stenopetalum, Heurok d			esculenta, Heyne	•••	"	377
Muell		455	falcata, Hassk		"	371
subalternans, Wall		454	Forskalii, Vahl	•••	"	371
sundaicum, Miq		458	gigantea, Vahl	•••	17	379
4 117-11		457	1 -1-1 - All -1 -	•••	"	371
tetragonocarpum. Kurz		454	Hamiltonii, Spreng.	•••	"	390
tetralophum, Clarke		454	Hasskarlii, Clarke	. •••	"	370
Thwaitesianum, Heurok &	. 11	101	herbacea, Roxb	• •••	"	377
'		458	himmen Olauka	•••	"	871
A . 2 0 . 3 2 . A		454	Linuis Trans	•••	"	890
	"	454	TT Table 1 Total	•••	"	379
		457		•••	"	373
Van Heurckii, Muell	"	453	Kurzii, Clarke	•••	"	380
virgatum, Wall	"	456	lanuginosa, Heyne	•••	"	369
Walliobii, DC	"	456	linearifolia, Kunth	•••	"	
Wallichii, Hassk	"	455	lineolata, Bl	•••	"	877
Wallichii, Kurz	"		longicaulis, Jacq	•••	"	369
Wightianum, Thw	"	458	longifolia, Spreng	•••	"	379
Wightianum, Wall	"	458	longifolia, Thw	•••	"	373
sp., Griff	"	459	lunata, Heyne	•••	"	374
sp., Hk. f. & T	"	455	maculata, Edgew	•••	"	372
Cometes, Linn	ıv.	712	? minuta, Bl	•••	"	379
apiculata, Dene	"	712	mollis, Jacq	•••	"	370
surattensis, Burm	"	712	multicaulis, Hochst.	•••	"	373
Commelina, Linn	▼1.	368	nana, Roxb	•••	"	378
agraria, Kunth	"	369	nervosa, Burm	•••	"	870
alba, Ham	"	374	nilagirica, Steud	•••	"	371
albescens, Hassk	,,	373	Nimmoniana, Grah.	•••	"	374
angustifolia, Hussk	"	373	nudicaulis, Burm	•••	"	879
appendiculata, Clarke	"	374	nudiflora, Linn	•••	"	369
attenuata, Kæn	77	372	nudiflora, Linn	•••	"	379
avenæfolia, Grah	"	374	obliqua, Ham	•••	"	372
avillaris, Linn	_22_	889	paleata, Hassk	•••.	"	872
. 9	870,		paludosa, Bl	•••	"	372
benghalensis, Wall	٧i.	372	paludosa, Burm	•••	"	372
bracteolata, Lamk	"	378	pedunculosa, Link	•••	"	370
cæspitosa, Roxb	12	369	persicariæfolia, Wight	•••	,,	872
canescens, Vahl	"	370	polyspatha, Wight	•••	"	372
clavata, Clarke	**	371	procurrens, Schlocht.	•••	"	370
coelestis, Willd	"	369	prostrata, Regel	•••	"	370
communis, Linn	"	374	pumila, Royle	•••	"	378
communis, Roxb	"	372	radicans, Spreng	•••	"	379
communis, Wall		870,	rajmahalensis, Clarko	•••	"	372
371,			repens Roxb	•••	"	372
communis, Walt	▼i.	369	rugulosa, Clarke	•••	"	874
conspicua, Bl	"	382	salicifolia, Rosb	•••	"	870
P cristata, Bl	"	885	salicifolia, Bojer	•••	"	869
cucullata, Linn	"	870	salicifolia, Thw	•••	"	371
cymosa, Bl	"	890	scaberrima, Bl	•••	"	382
deficiens, Van Houtte	"	869	scapiflora, Roxb.	•••		875
delicatula, Schlecht	"	870	Schimperiana, Hochst.	•••	,,	378
densiflora, Bl	"	890	secundiflora, Bl	•••	"	368
diandra, Kon	"	379	semiovata, Ham	•••	"	372
diffusa, Burm	"	369	semiovata, Wall	•••	"	374
Donii, Dietr	"	872	setosa, Wight	•••	,,	378
elata, Vahl	99	877	sikkimensis, Clarke	•••	,,	369

Commelina	Vol.	Page	1	Vol.	Page
		374	Connarus, Linn	ii.	50
sinica, R. & S	"	379	asiaticus, Willd	"	50
spirata, Linn	"	378	Championii, Thw	"	52
striata, Edgew	"	372	falcatus, Bl	"	53
striata, Hochst	"	369	ferrugineus, Jack	"	51
	373,	1	floribundus, Wall	"	52
	vi.		foliolosus, Jack	"	54
subulate, Roth	"	369	fulgens, Wall	"	49
suffruticoss, Bl		374	gibbosus, Wall	"	52
tuberosa, Lour	"	375	grandis, Jack	"	58
turbinata, Vahl		370	Griffithii, Hk. f	"	52
undulata, Br	"	373	igneus, Wall		54
vaginata, Linn	"	381		78, i	i. 54
zeylanica, Falkenb	"	374	latifolius, Wall	ii.	58
sp., Edgew	"	374	Maingayi, Hk. f	"	53
sp., Hk. f. & T vi. 373,	374.	387	I mimosoides, Jack	"	49
sp., Miq			mimosoides, Vahl ii. 4		. 54
sp., Wall	"	373		ii.	50
COMMELINACEÆ	νi,	366	monocarpus, W. & A	"	47
COMMELINEE		366	monophyllus, Wall	"	56
Commersonia, Forsk	i.	378	oliogophyllus, Planch	"	53
echinata, Bl	,,	378	paniculatus, Roab	"	52
herbacea, G. Don	"	376	? pentandrus, Roxb	,,	52
javensis, G. Don	"	378	pinnatus, Lamk	"	50
platyphylla, Andrews	"	378	Ritchiei, Hk.f	"	51
Compositæ iii.	219.		? rugosus, Wall	"	48
Compsanthus maculatus, Spren	ø.vi	359	santaloides, Vahl	"	47
Compsoa maculata, D. Don			semidecandrus, Jack	"	52
Convercibum javanense, Bl.		422	unifoliatus, Thw	"	55
*	"	422	Pvelutinus, Wall	"	54
Conchidium, Griff		785	Wallichii, Planch	"	58
pusillum, Griff		788	Wightii, Hk. f	"	51
Conchophyllum imbricatum, B		51	Conobea indica, Spreng	iv.	269
Conges, Roxb			Conocarpus acuminata, Roxb.	ii.	450
azurea, Wall iv.			latifolia, DC	**	450
	iv.		CONOCEPHALEE	Ÿ.	478
ferruginea, Wall		601	Conocephalus, Bl	₹.	545
Jackiana, Wall iv.		602	amonus, King	"	545
paniculata, Wall iv.			? azureus, Teysm. & Binn.	"	546
pentandra, Roxb		602	concolor, Dalz	"	546 [\]
pentandra, Wall	,,	602	gratus, Miq	"	545
tomentosa, Roxb	,,	603	naucleiformis, Lindl	"	545
unguiculata, Wall	,,	601	niveus, Wight	"	590
velutina, Wight	"	603	ovatus, Trecul	"	545
vestita, Griff	"	603	pubescens, Treoul	"	545
villosa, Wight	"	603	Rowburghii, Trecul	"	545
sp., Griff		601	Scortechinii, King	"	545
Conghas zeylonensis, Hb. Madr		681	suaveolens, $\hat{B}l$,,	545
CONIFERÆ		643	suaveolens, Trecul	"	545
CONNARACEÆ	ii.	46	subtrinervius, Miq	"	546
Connaracea, Wall i. 676, i	i. 47	, 49,	Conophallus bulbifer, Schott	vi.	515
51, 52, 6	i3, i1	r. 13	commutatus, Schott	,,	515
	ii.	46	lyratus, Schott	"	517
Connaropsis, Planch	i.	439	tuberculiger, Schott	"	517
diversifolia, Kurz	,,	440	CONOSTYLEE	vi.	264
Griffithii, Planch	••	440	Conringia, Rchb	i.	152
monophylla, Planch	,,	440	planisiliqua, Fisch. & Mey.	,,	152

Conringia	V ol. ∶	Page	Convolvulus	1	7ol. Page
Thaliana, Robb		148	capitatus, Vahl		iv. 193
Convallaria cirrifolia, Wall	v i.	322	capitellatus, Wall		,, 204
Govaniana, Wall	. ,,	319	capitiformis, Poir		,, 193
leptophylla, D. Don	. ,,	321	carnosus, Spreng		,, 213
multiflora, Linn	. ,,	319	cephalanthus, Wall		,, 216
oppositifolia, Wall	,,	321	chinensis, Ker		,, 219
punctata, Wall	. ,,	321	Choisyanus, Wall		,, 188
verticillata, Linn	. ,,	321	chryseides, Spreng		,, 206
sp., Griff		341	coccineus, Spreng		,, 199
CONVALLABIEZE		300	cæruleus, Spreng	•••	,, 19 9
CONVOLVULACEÆ		179	copticus, Linn :.		,, 200
CONVOLVULEA	., iv.	180	crispatulus, Wall		,, 212
Convolvuloides palmata,	_		cuneatus, Willd		,, 191
Moench	. iv.	204	cymosus, Lamk		,, 211
triloba, Moench		199	cynanchifolius, Wall.		,, 208
Convolvulus, Linn	. iv.		dasyspermus, Spreng.	• • • •	,, 215
	,,	217	dentatus, Vahl		,, 206
	,,	213	denticulatus, Lamk.		,, 208
Adansonii, Lamk	,,	210	denticulatus, Spreng.		,, 205
	,,	196	deserti, Hochst. &	Steud	,, 218
affinis, Wall iv	r. 206,	207	dichrous, R. & S		,, 213
Aitohisoni, Clarke	. iv.	218	digitatus, Roxb	• • • • • • • • • • • • • • • • • • • •	,, 215
albicans, Wall amplus, Wall anceps, Linn	. ,,	213	digitatus, Spreng		,, 20 2
amplus, Wall	. ,,	185	Dillenii, Lamk.	• •••	,, 199
anceps, Linn	,,	212	dissectus, Linn		,, 214
angularis, Linn	. ,,	213	divaricatus, Wall		,, 219
angustifolius, Lamk	. ,,	205	edulis, Thunb		,, 202
arenarius, Vahl	. ,,	213	elegans, Wall		,, 224
argenteus, Wall	. ,,	185	ellipticus, Spreng	• • • • • •	,, 192
argyrophyllus, Wall	. ,,	186	emarginatus, Vahl		,, 201
arvensis, Linn	. ,,	219	eriocarpus, Spreng	• •••	,, 204
asclepiadeus, Wall	. ,,	220	erythrocarpus, Wall.	•••	, 187
asper, Wall	,,	198	esculentus, Salieb	• •••	,, 202
atropurpureus, Wall	. ,,	194	fastigiatus, Roxb	• •••	,, 209
barbatus, Wall	٠,,	195	fastigiatus, Wall.		, 187
barbiger, Wall	. ,,	193	festivus, Wall	. i v. l	
barlerioides, Wall	,,	201	filicaulis, Vahl		iv. 205
Batatas, Linn	. ,,	202	Finlaysonianus, Wall	•	,, 186
Beladambu, Spreng	,,	210	flagelliformis, Roxb.	•••	,, 209
bellus, Spreng	. ,,	215	flavus, Willd	• •••	, 219
Benthami, Wall	. ,,	205	formosus, Roxb	• •••	,, 214
bicolor, Vahl	. ,,	216	fulgens, Wall	•	, 191
bilobatus, Roxb	. ,,	212	gangeticus, Linn		,, 206
binectariferus, Wall	. ,,	216	gangeticus, Roxb		,, 184
blandus, Roxb	. ,,	211	gangeticus, Wall		,, 210
Blumii, Dietr	. ,,	205	gemellus, Burm	• • • • • • • • • • • • • • • • • • • •	,, 207
brachyphyllus, Boiss	. ,,	217	gemellus, Wall		" 207
bracteatus, Vahl	. ,,	216	glandulosus, Ham		, 195
Brownii, Spreng	. ,,	214	glandulosus, Wall		" 220
bryoniæfolius, Salisb	• ,,	204	glomeratus, Chois		, 219
cæspitosus, Roxb	. ,,	205	glomeratus, Wall		., 190
cairicus, Linn	٠,,	215	gossypinus, Wall	• •••	, 203
Calverti, Boiss	. ,,	218	grandiflorus, Linn. f.	•••	, 198
calycinus, Roxb	• ,,	201	grandiflorus, Wall		, 197
campanulatus, Spreng	• ,,	211	Hardwickii, Spreng.	•••	, 201
candicans, Roth	•••	183	hastatus, Lamk		,, 205
candicans, Wall	. ,,	184	hederaceus, Linn	• •••	,, 199

Convolvulus		Page	Convolvulus		Vol.∶	
hepaticifolius, Spreng	. iv.	204	pentaphyllus, Linn.	•••	ĭ₹.	202
heptaphyllus, Rottl	. ,,	215	Pes-Capræ, Linn	•••	"	212
hirsutissimus, Wall	. ,,	193	Pes-tigridis, Spreng.	• • •	"	204
hirsutus, Roxb		202	phaniceus, Spreng	•••	,,	199
hirtus, Wall		207	pileatus, Spreng	•••	"	203
hispidus, Vahl		204	pilosus, Roxb	•••	"	213
hypocrateriformis, Lamk	• • •	184	platensis, Spreng	•••	**	202
imbricatus, Spreng		191	platypeltis, Spanog.	•••	"	211
incrassatus, Wall		209 202	pluricaulis, Chois	····	206,	218 210
indicus, Moris			polyanthus, Wall			
insignis, Spreng		$\frac{202}{216}$	pomaceus, Wall		188,	200
involucratus, Ker		214	purpureus, Linn	•••	í⊽.	199
kentrocaulos, Steud		210	Quamoclit, Spreng	•••	"	214
Kleinii, Spreng Kleinii, Wall		214	quinatus, Spreng	• • •	"	210
		218	racemosus, R. & S	•••	"	204
lanuginosus, Aitch lanuginosus, Lamk	• • •	218	Rampania, Wall reniformis, Roxb	• • •	"	206
		207		•••	"	210
Land T. Dank		192		• • •	"	210
7		186	737 717 717 13	•••	"	201
72-24-72 387-11		205	rhyniospermus, Hochst.	•••	"	218
		213	roseus, Kunth		"	202
11/C-1/ CI-100		215	Rothii, Spreng	•••	"	211
1I O		199	Rottleri, Spreng	•••	"	189
malabaricus, Heyne		190	Rottlerianus, Chois.	· · ·	,,	219
	189	, 190	()1 1.22 NET - 11		**	185
malabaricus, Roxb		210	rubens, Wall	•••	"	195
malabaricus, Wall		186	rubicundus, Wall		"	195
Malcolmii, Roxb		219	rufescens, Chois	•••	27	219
marginatus, Lamk		209	rugosus, Rottl		"	209
maritimus, Lamk		212	rupestris, Pallas		"	207
maximus, Vahl		209	scindicus, Stocks	•••	"	217
medium, Roxb		205	scindicus, Boiss		"	218
melanostictus, Schldl		184	semidigynus, Roxb		"	223
microcalyx, Clarke		22 0	sepiarius, Wall		,,	209
microphyllus, Sieb		218	sessiliflorus, Spreng.		,,	204
multibracteatus, Wall		192	setosus, Wall		"	194
		, 214	sibiricus, Linn	•••	,,	207
muricatus, Linn			simplex, Pers		,,	205
nemorosus, R. & S		202	speciosus, Linn. f		"	185
nerrosus, Burm		185	sphærocephalus, Roxb.		"	204
Nil, Lino		199	stipulaceus Roxb		,,	209
oblongus, Wall	. ,,	201	stipulatus, Lamk		,,	200
obovatus, Wall	. ,,	194	stoloniferus, Cyr		,,	213
obscurus. Linn	. ,,	207	striatus, Vahl	•••	,,	209
obtectus, Wall	. ,,	186	strigosus, Spreng		,,	194
orixensis, Rottl	. ,,	191	strigosus, Wall		,,	193
ornatus, Wall	. ,,	183	Tarita, Ham	iv.	183,	22 0
paniculatus, Linn	. ,,	202	tenuifolius, Ham	• • •	iv.	
paniculatus, Wall	. ,,	213	tenuifolius, Vahl		,,	214
parviflorus, Vahl	. ,,	220	Thonningii, Schum	•••	,,	200
pedatus, Roxb	. ,,	215	tiliæfolius, Lamk		,,	184
peduncularis, Wall penangianus, Wall	٠.,	186	tridentatus, Linn	• • •	"	205
	. ,,	196	triflorus, Vuhl	•••	"	209
pennatus, Lamk	. ,,	199	triqueter, Vahl	•••	"	212
pentadactylis, Wall		214	Tuba, Schlecht	•••	"	198
pentagonus, Roxb	. ,,	211	tuberculatus, Lamk	•••	,,	215
•						

Convolvulus	Vol	. Page	Conyza	Vol.	Page
Turpethum, Linn			elongata, Wall	iii.	270
umbellatus, Wall		011	eriophora, Wall	*** 33	295
uniflorus, Lamk		201	eupatarioides, Wall	,,	295
valerianoides, Blanco	•••	220	excisa, Wall	,,	269
vestitus, Wall		192	extensa, Wall	,,	239
vitifolius, Linn	••	213	falcigera, Wall	,,	269
Wallichianus, Spreng	••	217	fasciculata, Wall	••• ,,	270
Wightii, Wall		909	fistulosa, Roxb	,,	262
zeylanicus, Moon		216	foliolosa, Ham	••• ,,	298
Conyza, Less	• • •	===	foliolosa, Wall	iii. 261,	397
abbreviata, Wall		234	glomerata, Wall	iii.	262
-1-1-11-11-11- DO		259	gracilis, Heyne		265
		239	gracilis, Wall	••	262
adenocarpa, Dalz. & Gibs.	"	259	grandis, Wall	•••	269
mammata na 'Ait		959	graveolens, Wall	,,	254
manufican TIL & LM	•	954	heterophylla, Lamk	••• ,,	234
		9/71	1 2 2 22 22 22	,,	295
alata, Roxb	• • • • • • • • • • • • • • • • • • • •	260	1 77 337 33	,,	263
amplectens, Wall	•		1	,,	
amplexicaulis, Lamk	. ,,		hieracifolia, Spreng.		263
amplexicaulis, Wall	, ,,	261	hirsuta, Wall	iii. 258,	
anagallidifolia, Wall	,,,		holosericea, Wall	iii.	262
andryaloides, DC	, ,,		hymenophylla, Wall.	,,	265
angustifolia, Roxb	. ,,	258	incana, Wall	∶,,	234
angustifolia, Thw	,,,	254	indica, Miq	,,	272
anthelmintica, Linn	,,,	236	indica, Wall	,,	238
appendiculata, Bl		O/T/O	japonica, Less	,,	2 58
arborea, Wall		വെ	Jerdoni, Clarke	iii. 254,	258
argentea, Wall		905	lacera, Roxb	iii.	263
aromatica, Wall	•	970	laciniata, Roxb	,,	264
asteroides, Wall	•••	ozo	lactucæfolia, DO	,,	263
attenuata, Wall		991	lactucæfolia, Wall	,,	261
aurita, Linn. f	•	271	lanceolaria, Roxb	,,	269
balsamifera, Lipp	• • • • • • • • • • • • • • • • • • • •	270	lanceolata, Wall	iii. 234,	272
114 337 11		262	lanuginosa, Wall		295
2 22 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	•••	234	linifolia, Wall		234
2.76.77.4 38711		261	longicaulis, Wall	,, iri. 243,	
1. (A. 1) A VIIT (11.3)		261	longifolia, Heyne	iii.	269
	-	241			268
blanda, Wall	• • • • • • • • • • • • • • • • • • • •	230		,,	263
bracteolata, Wall			macrostachya, Wall	••• ,,	
candicans, Wall	• • • • • • • • • • • • • • • • • • • •	387	marginuta, Edgew	,,	259 265
Candolleana, Boiss	, ,,	272	membranacea, Wall	,,	
Cappa, Ham	, ,,	295	mollis, Willd	••• ,,	234
cernua, Wall	, ,,	271	multicaulis, DC	••• ,,	258
chinensis, Lamk	. ,,		multiflora, Wall	• • • • • • • • • • • • • • • • • • • •	234
chinensis, Linn	. ,,	268	muralis, Hanı	,,	265
cinerascens, Wall	. ,,	234	Musra, Ham	••• ••	263
cinerea, Linv	. ,,	234	napifolia, Wall	,,	263
conspicua, Wall	, ,,	257	natans, Ham	,,	263
corymbosa, Rozb		272	nutans, Bl	,,	271
cuneifolia, Wal!	• • • • • • • • • • • • • • • • • • • •	679	nutans, Wall	,,	363
dasycoma, Miq		269	obliqua, Willd	,,	260
densiflora. Wall	• • • • • • • • • • • • • • • • • • • •	269	obovata, Wall	,,	268
diffusa, Roxb	•••	265	odontophylla, Boiss	,,	273
disticha, Wall	• • • • • • • • • • • • • • • • • • • •	253	ovata, Wall	,,	234
divergens, Wall		234	paniculata, Wall	,,	261
elæagnifolia, Wall	• • • • • • • • • • • • • • • • • • • •	237	patula, Ait	iv. 235,	
7 . 7 977 13	•	234	P petiolaris, DC	iv.	
elegantula, Wall	"	LUI	· Personais, DO		

Conyza		Vol.	Page		Ŧ	7ol. F	age
pinnatifida, Roxb		iii.	259	Copisma, E. Mey		ii.	223
polycephala, Edgew.	•••	,,	258	Coptis, Salish		i.	22
polygonata, Wall	•••	"	293	Teeta, Wall		"	23
procera, Wall		"	268	Coptosapelta, Korth		iii.	34
prolifera, Lamk			234	flavescens, Korth	:	,,	35
pubescens, DC		"	254	Griffithii, Hk. f	•••	"	35
punctulata, Wall	•••	"	235	Corallobotrys, Hk. f	•••	iii.	455
7 317-11		"	240	acuminata, Hk. f		"	455
	•••	"	262	Corallocarpus, Welw		iï.	627
	•••	"	262	concearpa, Hk. f			628
7 77 1	•••	"	268	epiges, Hk. f		•,	628
repanda, Roxb	•••	"	268	Petbaica, Hk. f.		,,	628
riparia, Blume	•••	"	253	1 77 111 771 4		,,	628
Roylei, DC rufa, Wall runcinata. Wall	•••	"	259	1 1 1 TTT 6	•••	"	628
ruis, Wall	•••	"	264	1 ~ ~	•••	" V.	709
	•••	"		l	•••		709
saliyna, Wall	•••	"	235	indica, Lindl	•••	"	710
scandens, Wall	•••	"	241	innata, Br	•••	"	710
semipinnatifida. Wall.	•••	"	257	Jacquemonti, Done	•••	"	709
semivestita, Wall	•••	"	268	sp., Lindl	•••	"	
senecioides, Ham	•••	,,	672	Corchorus, Linn	•••	1.	396
sericea, Wall	•••	"	262	acutangulus, Lamk	•••	"	398
serici-vestita, Wall		"	268	æstuans i Ham	•••	"	398
serrulata, Clarke	• • •	,,	259	æstuans, Hb. Madr	•••	"	398
serrulata, Wall		"	258	Antichorus, Rœusch	•••	"	398
sessilifolia, Wall		"	272	Burmanni, DC	•••	"	398
sonchifolia, Wall		"	264	capsularis, Linn	•••	"	397
spinidens (spiridens),	Mig.	,,	265	decemangularis, Roxb.	•••	"	397
squarrosa, Wall		,,	269	fascicularis, Lamk	•••	"	398
striata, Wall		,,	25 8	fuscus, Roxb	• • •	"	398
stricta, Willd	•••	,,	258	humilis, Munro	•••	,,	398
stricta, Wall	• • •	,,	258	linearis, Wall	•••	,,	398
subcapitata, Wall		"	262	Marua, Ham	•••	"	397
subsessilis, Wall		,,	230	olitorius, Linn	• • •	"	397
subsimplex, Wall	iii.	234	, 265	olitorius, Wall	•••	"	397
tenera, Wall		iii.	266	pumilus, Ham	• • • •	"	399
thyrsiflora, Ham		"	263	subscandens, Wall	•••	"	398
tomentosa, Wall		,,	272	tridens, Linn	•••	"	398
travancorensis, Wall.		,,	258	trilocularis, Linn	•••	"	397
umbrosa, Kar. & Kir.		,,	253	trilocularis, Burm	• • •	,,	398
veronicæfolia, Wall		,,	258	urticæfolius, W. & A.	•••	,,,	397
vestita, Wall		,,	270	Cordin, Linn	• • •	iv.	136
villosa, Ham			263	acuminata, Wall	•••	,,	143
villosa, Wall		"	260	africana, Lamk	•••	"	136
virens, Wall	iii.	. 264	, 265	angustifolia, Roxb	•••	,,	138
viscidula, Wall		. iii.	258	campanulata, Roxo	•••	"	140
volkameriæfolia, Wall.		,,,	240	cordifolia, Wall	.,.	"	137
volubilis, Wall		,,,	257	coromandeliana, Koen.	æ		
Wallichii, DC		. ,,	258	Retz	•••	,,	144
wangtuensis, Clarke, l	apsu			diversa, Thw		"	137
Brachyaotis	• • • •	,,	253	domestica, Roth		,,	137
Wightiana, Wall	iii	. 2 39	, 261	Finlaysoniana, Wall.	•••	,,	140
Cookia dulcis, Bedd		. i.	506	fragrantissima, Kurz		••	139
graveolens, W. & A	•••	. ,,	505	fulvosa, Wight	IV.	137,	
? macrophylla, Lindl.	•••	. ,,	504	grandis, Roxb	•••	iv.	137
punctata, Hassk	•••	. ,,	502	grandis, Wall	•••	"	137
punctata, Retz	•••	, ,,	559	Griffithii, Clarke	•••	**	139
punctata, Sonn		. ,,	505	hexandra, R. & S		"	140

Cordia	V ol.	Page	l v	ol, Page
incana, Royle	iv.			ii. 740
indica, Lamk	,,	136	Cornus, Linn	ii. 744
latifolia, Roxb	,,	137	alternifolia, Linn. f	,, 744
latifolia, Wall	,,	136	australie, C. A. Mey	,, 744
? Leschenaultii, DC.	,,	138	brachypoda, C. A. Mey	,, 744
Macleodii, Hk. f. & T.	,,	139	capitata, Wall	" 745
monoics, Roxb	,,	187	japonica, Thunb	,, 745
Myxa, Linn	,,	186	macrophylla. Wall	" 744
Myxa, Thw	,,	137	oblongs, Wall	,, 744
obliqua, Willd	,,	137	sanguinea, Linn	,, 744
obliqua, Willd obliqua, Wight	,,	137	Cornutia corymbosa, Burm. iv. 5	573, 576
oblongifolia, Thw	,,	138		67, 576
octandra, A. DU	,,	140	Coronilla aculeata, Willd	ii. 115
officinalis, Lamk	,,	136	cannabina, Willd	,, 115
orientalis, Br	,,	140	grandiflora, Willd	" 115
paniculata, Roth	,,	136	Sesban, Willd	" 114
Perrottetii, Wight	,,	138	Cortis, DC	ii. 701
Perrottetii, A. DC	,,	138	elata, Edgew	,, 698
polygama, Roxb	,,	137	Hookeri, Clarks	,, 702
polygama, Wall	,,	14u	Lindleyii, DC	,, 701
reticulata, Roth	,,	138	vaginata, Edgew	,, 700
retusa, Vahl	,,	144	sp., Hk. f. & T 11. 6	
Rothii, R. & S	,,	138		iii. 50l
rotundifolia, Heyne	,,	139	Matthioli, Linn	,, 501
Roxburghii, Clarke	,,	139		71. 107
Rumphii, Bl	,,	140		i. 121
Sebestena, Forsk	,,	136		·,, 127
serrata, Roxb	,,`	140	astr igalina, Hk. f. & T	,, 126
subcordata, Lamk	,,	140	cachemirians, Royle	, 123
subopposita, DC	,,	138	chærophylla, DC	, 126
thyrsiflora, Sieb. & Zuctomentosa, Wall	cc. "	141	cornuta, Royle	,, 126
tomentosa, Wall	,,	137	crassifolia, Royle	,, 127
vestita, Hk. f. & T	,,	139	crassissima, Camb	, 127
Wallichii, G. Don		187	crithmifolia, Royle	,, 123
	i v . 137,		debilis, Edgew	, 126
~	jv.	140	diphylla, Wall	, 122
CORDIEÆ	i▼.	184	elegans, Wall	, 124
Cordylestylis foliosa, Falc.		111	epithymifolia, Walp	, 123
Cordyline, Commers	vi.	331	Falconeri, Hk. f. & T	, 124 125
Jacquininii, Kunth	••• ,,	331	filiformis, Royle	" 125 127
Sieberi, Kunth	••• ,,	331	flabellata, Edgew	" 199
terminalis, Kunth	,,	331	flacoida, Hk. f. & T	" 196
terniflora, Planch	!!	330	geraniijolia, Hk. f. & T	195
Cordyloblaste Henscheli, M	••	588	Gortschakovii, Schr Govaniana, Wall	″ 19 <i>4</i>
	ii.	717	מינית מינית או	″ 100
sativum, Linn	;;	717 4+	77 74 1 1 D	199
Coriaria, Linn	ii.	41	77 (*	" 197
nepalensis, Wall	ji.	44		195
		64		" 199
Coridochloa cimicina, Noes		64	junces, $Wall$,	" 194
fimbriata, Nees	,,	64	latiflora, Hk . f . g T leptocarpa, Hk . f . g T	″ 100
semi-alata, Nees	,,	6±		" 10E
	,,	873	1. Turn D. D	" 199
Corisanthera vestita, Griff		2	10 11 177 17	" 10G
A 1	▼. ▼.	9	Moorcroftians, Wall	" 19E
1		ä	ophiocarpa, Hk. f. & T	" 123 " 122
a, sopionam, non.	••• ,,	-		,,

Corydalis	Vol.	Page	Costus Vol. Page
paucistora, Edgew	i.	122	globosus, Bl vi. 250
physocarpa, Camb	"	127	Kingii, Baker ,. 250
polygalina, Hk. f. & T	,,	128	malaccensis, Koen ,, 255
ramosa, Wall	"	125	nipalensis, Rosc ,, 250
rutæfolia, Sibth	"	122	speciosus, Sm ,, 249
sibirioa, Pers	"	125	Cotoneaster, Linn ii. 384
stricta, Stephan	"	126	acuminata, Lindl ,, 385
tibetion, Hk. f. & T	"	124 123	affinis, DC ,, 387
verticillaris, DC	"	599	1
CORYLEE	₹.	399 427	"" ' ' ' '
Corylopsis, Sieb. & Zucc	ii.	427	1 111 - 11 - 11 - 11 - 11 - 11 - 1
himalayans, Griff multiflora, Hance	"	428	1 10 11 777 11 " 00/7
	", V.	625	D-1 007
Corylus, Linn Colurna, Linn		625	297
ferox, Wall	,.	625	Cuii.d. 107-111 " 995
Jacquemontii, Dene	"	625	1
	"	625	Lindleyi, Steud ,, 386
lacera, Wall Corymbis, Thou	vi.	91	miorophylla, Wall ,, 387
brevistylis, Hk. f	"	92	microphylla, Wall " 387
disticha, Lindl	"	91	multiflora, Hunge ,, 386
longiflors, Hk. f	"	92	nepalensis, Hort ii. 385, 386
rhytidocarpa, Hk. f	"	92	nummularia, Fisch. & Mey. ii. 386
veratrifolia, Rchb. f	"	91	obtusa, Wall ii. 384, 385
Corymborchis assamica, Bl		91	prostrata, Baker ii. 386
veratrifolia, Bl		91	rosea, Edgew ,, 385
Corynandra pulchella, Schrad	l. i.	170	rotundifolia, Wall ,, 386
Corypha, Linn	٧i.	428	rotundifolia, Str. & Wint. 11. 385
elata, Roxb	,,	428	Royleana, Hort ,, 385
Gebangu, Kurz	,,	428	Roylei, Hort ii. 385, 386
macropoda, Kurz	,,	429	Simonsii, Hort ii. 386
Martiana, Becc	,,	429	thymifolia, Hort ,, 387
Saribus, Lour	"	435	vulgaris, Lindl ,, 385
Taliera, Roxb	,,	428	sp., Str. & Wint ,, 386
umbraculifera, Linn	"	428	Cottonia, Wight vi. 26, 178
umbraculifera, Wall	"	429	Championi, Lindl vi. 26
CORYPHEE	¥1.	404	macrostachya, Wight ,, 26
Corysanthera elliptica, Wull.	1V.	873	peduncu'aris, Rohb. f ,, 26
vestita, Griff	,,	87 3	Cotuls, Linn iii. 316
sp., Griff	"	374	anthemoides, Linn , 316
Corysanthes, Br	vi.	118	aurea, Linn ,, 316
fornicata, Lindl	"	118	207
picta, Lindl Coryzadenia trifoliata, Griff.	?"	118 460	dishasambala Olamba " 040
		98	dishussankala Cak 916
Coscinium, Colebr Blumeanum, Miers	i.	99	
fenestratum, Colebr	*>	99	1-4/4-1/- Th 045
777 71 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	"	99	
TITE 1 . 1 . 2.01	"	99	minima, Willd ,, 247
~	iı i .	3 10	D W7.11 917
Cosmos sulphureus, Cav Cosmostigma, Br	iv.	46	sinapifolia, Roxb. iii. 245, 246, 259
acuminatum, Wight		46	Sphæranthus, Link iii. 247
racemosum, Wight	"	46	sternutatoria, Wall ,, 317
Costus, Linn	γi.	249	Cotylanthera, Bl iv. 94
arabicus, Jacq	,,	250	paucisquama, Clarke ,, 94
arabicus, Linn	"	253	tenuis, Bl " 95
argyrophyllus, Wall	"	250	Cotyledon, Linn ii. 416
	**		

Cotyledon	7	Vol.	Page	Vol.	Page
amplexicaulis, Heyne		ii.	415	Craniospermum parviflorum,	
corymbosa, Hb. Rottl.		,,	415	Done iv.	171
heterophylla, Roxb	•••	"	415	Craniotome, Rchb iv.	671
hirsuta, Hb. Heyne	•••	"	414	versicolor, Rchb ,,	671
laciniata, Roxb	•••		415	Crassula, Linn ii.	413
Oreades, Clarke		"	416	campestris, Harv. & Sond. "	412
pinnata, Lamk		"	413		413
rhizophylla, Roxb	•••	"	413	pharnaceoides, Fisch. & Mey.,,	412
	 (800	"		Schimmoni Pinch & Mar	412
- 13 ·	•		416	Cm . cm . cm . cm	411
	•••	"	416	O	883
	•••	"	625	Olambai III. A	383
	•••	₹i.	625	Clarkei, Hk. f ,,	384
Opperoides, Nees	•••	,";	359	orenulata, Roxb ,,	375
Cousinia, Cass	•••	isi.	360	cuspidata, Spach ,,	383
auriculata, Bosss		"	360	glauca, Wall ,,	387
aralensis (avalensis), Bu	_	"	7 - 7	integrifolia, Herb. Ham. "	383
Brandisii, Clarke	•••	"	360	monogyna, Boiss "	
calcitrapiformis, J. & S	• •••	"	360	Oxyacantha, Linn ,,	383
Falconeri, Hk. f	• • •	,,	360	Pyracantha, Brand "	384
P Hystrix, Clarke	•••	"	361	ribesius, Bertol ,,	383
microcarpa, Boiss		,,	360	? Shicola, Ham ,,	371
minuta, Boiss		,,	359	Crateva, Linn i.	172
Thomsoni, Clarke		,,	360	apetala, Spreng "	171
Covellia assamica, Miq.		v.	523	Marmelos, Linn ,,	517
aurata, Miq		,,	531	Nurvala, Ham,	172
conglomerata, Miq		"	523	odora, Ham ,,	172
courtallensis, Miq			523	maliniana Manut	172
Cunia, Miq	•••	"	523		517
	•••	"	522	uslanda Hem	172
demonum, Miq	•••	"	523	Donlandkii Da	172
dasycarpa, Miq		`"	521		172
dasycaula, Miq. (lapsu F	icus	J "		unilocularis, Ham ,,	
didynama, Miq	•••	"	525	Vallanga, Koen ,,	516
glomerata, Miq	•••	"	536	CRATOXYLEE i.	252
Griffithin, Mig	• • •	"	519	Cratoxylon, Bl i.	257
guttata, Wight	• • •	,,	534	arborescens, Bl ,,	258
inæquiloba, Miq	•••	,,	523	bistorum, Turcz ,,	257
lanceolata, Miq	•••	,,	536	formosum, Benth. & Hk. f. "	259
lepidicarpa, Miq		,,	525	lanceolatum, Miq ,,	257
macrophylla, Miq	•••	,,	534	ligustrinum, Bl "	257
microcarpa, Miq	•••	,,	524	Maingayi, $Dyer \dots ,$,	258
mollis, Miq		"	536	neriifolium, Kurz ,,	257
oppositifolia, Gasp	•••	,,	523	polyanthum, Korth ,,	257
paniculata, Miq		•	524`	prunifolium, Dyer ,,	258
prostrata, Miq	•	"	524	72771.477 101	257
racemifera, Miq	•••	"	535	Crawfurdia, Wall iv.	106
	•••	"	524	- AC: - TIŽ-11	107
Ribes, Miq	•••	"	52 3	adenia Wall	107
setulosa, Miq	•••	"		affinis, Wall ,,	106
subopposita, Miq	•••	"	525	angustata, Clarke ,,	
tuberculata, Miq	,	33.	525	Blumei, G. Don ,,	107
volkhameriæfolia, Miq.	• • • •	"	525	campanulacea, Wall. &	100
	•••	,,	523	Griff ,,	106
Zollingeriana, Miq. (la	гры			fasciculata, Wall ,,	107
	• • •	₹.	5 2 l	fasciculata, Griff ,,	108
Cræpalia temulenta, Schr		vii,	. 364	fasciculata, Thw,	108
Orambe, Tourn		i.	165	fasciculata, Wall ,,	107
cordifolia, Stev		,,	165	japonica, Sieb. & Zucc "	107
Kotschyana, Boiss	•••	"	165	luteo-viridis, Clarke ,,	108
		77			

Crawfurdia	Vol.	Page	Crinum	1	Vol. Pa	ge
puberula, Clarke	iv.	107	asiaticum, Wall	٧i. ا	283, 2 (84
	,,	106	brachynema, Herb		vi. 2	84
	,,	106	bracteatum, Bot. Reg.	• • •		84
a	iii.	330	bracteatum, Willd		,, 21	84
D	,,	331	brevifolium, Roxb		,, 2	84
TT 1 ' (U 1	,,	331	canaliculatum, Carey		,, 20	84
	,,	331	canalifolium, Herb.		,, 28	84
	,,	331	canalifolium, Carey	•••		β3
_'	,,	332	Careyanum, Herb	•••		83
	,,	330	defixum, Ker			81
Michael Alanka	,,	331	elegans, Carey		,, 28	83
Cremastra, Lindl	vi. 16	, 178	ensifolium, Roxb			81
Wallichiana, Lindl	▼i.	16	erythrophyllum, Carey	•••	,,	84
Cremostachys fulva, Tulası	10 V.	378	Herbertianum, Schult.	•••	,,	84
Crepidium flavescens, Bl.	▼.	690	Herbertianum, Wall.	•••	,, -	83
107 111 101	,,	688	humile, Herb			82
	iii.	393	insigne, Schult		,, 28	83
annie III. f	,,	'396	latifolium, Linn			83
austriaca, Jaca,	,,	394	Linnai, Roem			83
1.1.44	,,	394	longifolium, Roxb			82
3	,,	397	lorifolium, Roxb		,, 28	83
4 " (N. 1) · ·	,,	394	macrocarpum, Carey			84
A	,,	393	moluccanum, Roxb		,, 28	83
a • ' To 11	,,	395	ornatum, Herb			83
. 1	,,	394	paucistorum, Miq	•••	", 2 <u>!</u>	95 .
glomerata, Benth. & Hk.		398	pedunculatum, Br			84
		397	pratense, Herb		" 20	82
	,,	376	procerum, Carey		,, 2t	81
!\! TII. A		396	pusillum, Herb			82
17 1 TT7 C 11 00		395	Roxburghii, Grah	•••		81
	• • • • • • • • • • • • • • • • • • • •	398	speciosissimum, Herb.			83
n 10 11		395	speciosum, Herb	•••	,, 21	83
W.A. I Olas I		393	stenophyllum, Baker		. 91	81
7 4 (01)		395	Stracheyi, Baker		28	82
		415	strictum, Herb		,, 2	84
		396	sumatranum, Rozb		" 2	84
. '/ 1' TO TO		398	toxicarium, Roxb			80
Total	• • • • • • • • • • • • • • • • • • • •	396	umbellatum, Carey		", 2 8	84
primulifolia, Hk. f. & T.	,,	395	venustum, Carey			83
		398	Wallichianum, Roem.			83
manageri Como IIII. C	• • • • • • • • • • • • • • • • • • • •	397	Wattii, Baker		2	81
alkiniaa Timu	•	394	zeylanicum, Linn	vi.	283, 2	84
-!11 -4	,,	397	sp., Wall.	•••	vi. 2	
Dialiantai Olaulu		396	Critho Aegiceras, E. Mey.		vii. 3	
A	"	395	Orocus, Linn			76
	,,	398	sativus, Linn	···		76
111. A A M	•••	397	Crossandra, Salisb			92
A	iv.	225	axillaris, Nees	•••		92
manufumiia Da		225	coccinea, Dalz. & Gibs.			92
anatica Time		225	infundibuliformis, Nees			92
1. Th	,,	225	oppositifolia, Nees	•••	" 40	92
Indication III Amalana	··· jı	224	undulæfolia, Salisb.	•••	" 40	92
Conces	i v .	180	O 1 1 T 1		", –	85
A	_•	280		•••		68
• •		282	acicularis, Ham acuminata, G. Don	•••	<i>"</i> •	77
	,,	280	m · no	•••	"	83
	,,	281		•••	"	39 39
asiaticum, Roxb	,,	201	alata, Ham	•••	,,	-

~ · · ·	,	er_)	Da	Crotalaria	v	al P	200
Crotalaria		voı. ii.	Page 71	Grahamiana, W. & A.	' i	ol. P ii.	85
			77	grandiflora, Zoll		,,	78
angulosa, Lamk	•••	,,	72	grandis, Hort	•••	"	80
anthylloides, D. Don	•••	"	73	herbacea, Schweig	•••	"	88
anthylloides, Lam	•••	"	78	herniarioides, W. & A.			81
Arnottiana, Benth	•••	**	75	heterophylla, Line	•••	"	85
assamioa, Benth	•••	"	76	Heyneana, Grah	•••	"	78
barbata, Grah	•••	"	79	hirsuta, Willd		"	68
benghalensis, Lamk	•••	"	69	hirsuta, Roxb	•••	"	70
bialata, Roxb	•••	"	69	hirsuta, Wall	•••	"	68
bifaria, Linn	•••	"	69	3 5 4 - TET/11 J		"	70
bifaria, Wall	•••	"	66	· · · · · - · · · · · · ·	•••	"	66
biflora, Linn	•••	"	71	Hookeri, Arn	•••	"	84
biflora, Herb. Madr.	•••	"	83	humifusa, Grah	•••	"	67
bracteata, Roxb	•••	"	73	•		"	83
brevipes, Champ	•••	"	84	junces, Linn	•••	"	79
Brownei, Rohb	•••	"	66			"	75
Burhia, Ham	•••	"	===		•••	"	84
Burmanni, DC	•••	"	75 79	laburnoides, Klotz	•••	"	84
cæspitosa, Rozb	•••	,,	72		•••	"	83
calycina, Schrank	•••	"	72	lævigata, Lamk	•••	"	77
Campbellii, Arn	•••	"	81	lanata, Bedd	•••	**	84
candicans, W. & A	•••	"	79	latifolia, Hort. Calc.	•••	"	68
canescens, Waii	•••	"	68	leioloba, Bartl	•••	"	78
caditata. Benth	•••	77	74	leptostachya, Benth.	•••	"	76
Cephalotes, Herb. Madr.		"	78	Leschenaultii, DC		"	72
chinensis, Linn	•••	"	78	linearis, Hb. Madr		'n	72
chinensis, Lamk	•••	"	81	linifolia, Linn. f		"	76
chinensis, Roxb	•••	,,	70	longipes, W. & A		"	80
clavata, W. & A		,,	83	lunulata, Heyne		"	76
cærulea, Jacq	•••	"	77	lupiniflora, Grah		"	74
crassifolia, Ham	•••	,,	68	lutescens, Dalz		"	81
crinita, Grah		,,	72	luxurians, Benth		"	75
cuneifolia, Schrank		,,	75	macrophylla, Weinm.	•••	"	229
cytisoides, Roxb		"	65	macrophylla, Willd	•••	"	83
cytisoides, Wight		,,	83	macropoda, A. Rich.	•••	"	
dichotoma, Roth		,,	69	macrostyla, D. Don		"	144
digitata, Hook			85	madurensis, Wight	• •••	"	79 91
digitata, Wight	•••		85	medicagines, Lamk.	•••	"	81
disticha, Zolling	•••		68	medicaginea, DC	• •••	"	82
divaricata, Grah			81	medicaginea, Ham	• •••	"	81
dubia, Grah	•••		78	melanocarpa, Wall	• •••	"	72
elegans, Bedd	•••	•	74	montana, Heyne	• •••	11	72
elliptica, Roxb	•••		85	montana, Roxb	• •••	"	71
epunctata, Dalz	•••		71	multiflora, Benth	• •••	"	69
eriantha, Sieb. & Zuco.		-	78	mysorensis, Roth	•	"	70
evolvuloides, Wight	•••		RR	nana, Burm	•	"	71
fenestrata, Sims	•••		79	neglecta, W. & A	•	"	81
ferrugines, Grah			- AR	nepalensis, Link		"	73
filiformis, Wall			AA.	neriifolia, Wall	• •••	"	74
filipes, Benth		-	· RR	P nervosa, Grah	• • • • • • • • • • • • • • • • • • • •	"	153
foliosa, Willd	••		81	Notonii, W. & A	• • • • • • • • • • • • • • • • • • • •	,,	82
formosa, Grah			78	nummularia, Willd		"	66
fulva, Rozb		•	XI)	00004		"	68
genistoides, Willd			, 82			"	79
glabrescens, Benth			79	occulta, Grah		"	72
globosa, W. & A	••		, 66	Oldhami, Miq		- 22	78
globulosa, Wight		_	, 66	orixensis, Rottl		**	88
ywwww, 11 Bas	•••		-				

C - 4 - 1 1 -		_	I (I4-2			_
Crotalaria		Page	Crotalaria		Vol.	Page 84
ovalifolia, Wall	. ii.	70	striata, DC	• • •	11.	
pallida, Klotz	. ,,	84	stricta, Roth	• • •	. ,,	82
paniculata, Willd	,,	81	stricta, Roxb	•••	,,	72
parva, Grah	,,	71	subperfoliata, Wight	• • •	,,	79
patula, Grah	. ,,	71	tecta, Roth		,,	72
peduncularis, Grah	. ,,	74	tenuifolia, Roxb	•••	"	79
	t .		tenuis, Wall		"	71
Gibs		74	tetragona, Rowh	•••		78
pedunculosa, Desv	••	84	tetragona, Wall		"	79
peguana, Benth	"	77	tomentosa, Rottl		"	81
	• • • • • • • • • • • • • • • • • • • •	81	trichophora, Benth.	•••	"	67
*		84	4	•••	"	69
	•••	70	trifoliastrum Willd	•••	"	82
pilosa, Roxb		68	trifoliastrum, Willd.	, ···	"	82
pilosissima, Miq	,,		trifoliastrum, Wall	•••	"	
pisiformis. Guill. & Perr	• ,,	84	triquetra, Dalz	•••	"	71
porrecta, Wall	٠,,	79	tuberosa, Ham	•••	,,	219
priestleyoides, Benth	- ,,	71	umbellata, Wight	• • • •	"	71
procumber, Roxb	- ,,	81	uniflora, Koen		,,	65
prostrata, Rozb	. ,,	67	Vachelii, H. & A	•••	"	85
prostrata, Wight	. ,,	67	vasculosa, Grah		"	85
pulcherrima, Roxb		80	venusta, Wall		"	78
pulchra, Andr	•••	80	verrucosa, Linn			77
pulchra, DC	••	80	montite Dullen		"	67
manadada Cash		71	ndusinan Wall	• •••;	i. "7	
- 111 /r	••	70			ii.	81
		84		•••		
quinquefolia, Linn		80	virgata, Roxb	•••	"	82
ramosissima, Roxb	. ,,		Walkeri, Arn	•••	"	78
retusa, Linn	. ,,	75	Wallichiana, W. & A.	•••	"	78
rhizophylla, Grah	. ,,	72	Wightiana, Grah	•••	"	70
rigida, Heyne	. ,,	82	Wightiana, Wall	•••	"	70
rostrata, W. & A	• ,,	82	Willdenoviana, DC .		,,	81
Rothiana, DC	. ,,	66	Croton, Linn	•••	v.	885
Rothii, Spreng	. ,,	66	ardisioides, Hk . f	•••	,,	393
Roxburghiana, DC		72	argenteus, Forsk		"	409
rubiginosa, Willd		69	argutus, Heyne	•••	"	892
rubiginosa, Roxb	••	69	argyratus, Bl	•••	"	385
sagitticaulis, Wall	••	69	aromaticus, Linn	•••		338
salicifolia, Heyne		77			"	888
Cl. 74.2 A A A	••	84		•••	"	890
		72	comes Veen	•••	"	409
	••	70		•••	"	
scabrella, W. & A		83	atrovirens, Hb. Madr.	•••	"	441
Schimperi, A. Rich			bacciferus, Wall	•••	"	442
scoparia, Wall	. ,,	71	bicolor, Roxb	•••	"	385
semperflorens. Vent	. 23	78	birmanious, Muell	•••	"	389
semperflorens, Benth	. ,,	78	Boragatch, Roxb	•••	"	387
sericea, Retz	• ••	75	bractiferus, Roxb	• • • •	"	399
sericea, Burm	. ,,	75	cardiospermus, Gærtn.	•••	,,	395
sericea, Willd	. ,,	79	cascarilloides, Rauesch	•	"	448
sessiliflora, Linn	. ,,	73	castaneifolius, Wall.	•••	"	434
sobolifera, Grah	ii. 71	. 72	caudatus, Geisel	•	"	888
spartioides, Spreng	22	82	caudatus, Muell			392
		78	. (12 1 107 - 11	•••	"	422
		75	akimamaia Dawah	•••	"	389
-A		72	ablama 1 777-11	•••	"	894
	ii. 82			· • • •	"	
	::		chrosophoraides, Kurz	•••	"	889
stipulacea, Roxb		70	coccineus, Vahl	•••	"	442
Stocksii, Benth	• >>	67 (coccineus, Wall	•••	99	441

Croton	V ol.	Page	Croton	Vol.	Page
calococous (colococous),			polyandrus, Roxb	v.	462
Kurs	v.	389		,,	409
crassifolius, Geisel		389		,,	390
? cyanospermus, Gærtn		305	man administration Dada	,,	442
denticulatus, Bl		388	id Ou-l	,,	395
denticulatus, Wall	, ,,	391		,,	442
diadenus, Miq	"	8 91	makiamlahma II	,,	386
distans, Wall		443		,,	440
drupaceus, Roxb		388	7	,,	440
? drupaceus, Wall		390	Diaman Anna	,,	395
Dudia, Ham		387	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,,	891
elæocarpifolius, Wall	,,,	387	7 . 7 . 7 10.77 7 347793 3	,,	442
erythrostachys, Hk. f	"	3 91	ricinoides, Pers	,,	430
flocoulosus, Kurz	"	3 94	roburtus, Kurz	,,	387
Gibsonianus, Nummo	"	392	Rottleri, Geisel	,,	409
glabellus, Heyne	"	403	Rottleri, Thw	,,	410
Griffithii, Hk. f	"	392	salicifolius, Geisel	,,	455
hastatus, Burm	"	409	scabiosus, Bedd	,,	386
hastatus, Linn	"	465	sebiferus, Linn	,,	470
hypoleucus, Dalz	"	386	solanifolius, Geisel	,,	462
Jamalgota, Ham	,,	393		,,	457
Jouffra, Miq	"	387		,,	390
Joufra, Roxb	"	387	tabacifolius, Geisel.	,,	395
Klotzschianus, Wight	"	392		,,	392
lacciferus, Blanco	"	447		,,	393
lacciferus, Muell	"	388		,,	384
lacciferus, Linn	,,	388	tinctorius, Wall	··· 9f	409
lacciferus, Wall	"	442	tinctorius, Burm	,,	409
lætus, Wall	"	425		,,	389
lævifolius, Bl	,,,	391	umbellatus, Dalz. & Gibs.	,,	403
	282,			,,	392
Lawianus, Nimmo	₹.	394		,,	402
leiophyllus, Muell	"	391		,,	402
longifolius, Wall	"	396		,,	465
malabarious, Bedd	"	386		,,	399
mollissimus, Geisel	"	430		,,	390
moluccanus, Willd	"	409			386
montanus, Wall	**	425		7, 390,	
montanus, Willd	"	443	CROTONEÆ	▼.	242
Moonii, Thw	"	390	Crozophora. (See Chrozophore		100
muricatus, Heyne	"	436	CRUCIFERÆ	<u>i</u> .	128
nervosus, Rottl. & Willd.,				ii.	271
lapsu A	"	440		,,	271
nigro-viridis, Thw	"	393	Cryphea erecta, Ham		100
obliquus, Vahl	"	409		Vii.	2 35
oblongifolius, Roxb	"	386	aculeata, Duthie	,,	235
oblongifolius, Del	"	409		••. 33	237
oblongifolius, Ham	"	387		. ,,	235
oblongifolius, Wall	"	387	dura, Boiss	•••	236
paniculatus, Lamk	"	430	maritima, Munro		249 235
Pavana, Ham	"	393	nilaica, Fres. & Notar	. ,,	
pedunculatus, Wall	"	287	phalaroides, Duthie	•••	236 995
persimilis, Muell	"	387	schenoides, Lamk	. ,,	235 235
philippensis, Lamk		442	vaginiflora, Opiz	. ,,	280 573
pictus, Wall	"	899	Crypteronia, Bl		574
plicatus, Roxb	77	410 4C9	Cumingii, Planch		574
plicatus, Vahl	**	200	glabra, Bl	•))	U/ T

C 1 !-	_		_ 1	(I	w.,	D
Crypteronia	V		Page	Cryptocoryne		Page 494
	•••	11.	574	spiralis, Fisch	, ₩i.	
paniculata, Bl	•••	"	574	spiralis, Thw	. ,,	492
paniculata, Kurz	•••	"	574	Thwaitesii, Schott	. ,,	495
pubescens, Bl	•••	"	574	unilocularis, Schott	. ,,	493
O Du	•••	Ÿ.	117	unilocularis, Wight		494
			118	777 11 . (7 7 44		492
	•••	"	118			493
	•••	"		Wightii, Schott		493
? Andersoni, King	•••	"	120	sp., Griff		
cæsia, $Bl.$	•••	"	119	Cryptolepis, Br	, í v.	5
caudata, Meissn		,,	117	Buchanani, R. & S	. ,,	5
costata, Bl	•••	"	121	elegans, Wall	. ,,	6
crassinervia, Miq			118	filiformis, Wall		9
	•••	"	125	110 77711	• • •	5
cuneata, Bl	•••	"	119			6
enervis, Hk. f	•••	"			. ,,	6
Ferrarsi, King	•••	"	118	pauciflora, Wight	. ,,	
ferrea, Bl	•••	"	119	reticulata, Wall	. ,,	5
· - T		,,	119	Wightiana, Wall	. ,,	6
0 . 1 I M		"	141	Cryptonema malaccensis,		
	•••		118	Turoz	▼.	665
		"	120			
	•••	"		101 and	•	510
Griffithiana, Wight	•••	"	117	Nees	, i v.	
impressa, $Miq.$	•••	"	117	canescens, Nees	. ,,	509
infectoria, Meissn	•••	,,	117	cordifolium, Nees	. ,,	502
Kurzii, <i>Hk. f.</i>		"	119	elongatum, Nees	. ,,	502
membranacea, Thw.	•••		120	glabrum, Ďalz	• • •	509
neilgherriensis, Meissn.		"	120		•••	510
	•••	"	118		• • • • • • • • • • • • • • • • • • • •	510
rugulosa, Hk. f	•••	"		sanguinolentum, Nees	. ,,	
Stocksii, Meissn	•••	"	120	serrulatum, Nees	. ,,	509
tomentosa, Hort. Calc.		,,	118	venustum, Nees	. ,,	508
venosa, Meisen	• • • •	,,	117	Cryptostegia, Br	. iv.	6
Wightiana, Thw		"	120	grandiflora, Br	. ,,	6
			121	Cryptostylis, Br	:	117
~ · \ \ \ 777 77		"	827	A 1 24		118
	•••	٧.	827			569
lutea, Lindl	•••	"		Cryptotheca apetala, Bl	ii.	
Meirax, Par. & Rohb.	f.	"	786	dichotoma, Bl		571
reticulata, Rohb. f.	•••	,,	78 6	Crytoceras, vide Cyrtoceras		
sanguinea, Wall	•••	,,	827	Ctenium digitatum, Spreng.	vii.	290
Cryptocoryne, Fisch		٧i.	492	indicum, Spreng		291
affinis, N. E. Br	•••		494	seychellense, Baker		284
		"	493	A. 1 . TT. A	••	629
	•••	"				630
ciliata, Fisch	•••	"	492	cerasiformis, Naud		
cognata, Schott	•••	"	494	Garoini, Naud		629
consobrina, Schott	•••	"	493	Ctenolophon, Oliv	i.	577
cordata, $Griff$		"	498	grandifolius, Oliv	. ,,	577
Dalzellii, Schott	•••	"	495	parvifolius, Oliv		577
drymorhiza, Zipp	•••		492	Culieba canina, Miq		82
7 4 40 400		"	492	1 7 4 350 -	-	82
	•••	"		Lamana Mia		82
elliptica, N. E. Br	•••	"	495	Lowong, Miq	• ,,	02
Gomezii, Schott	•••	"	495	macrostachya, Miq., vide	,	
Griffithii, Schott	•••	"	493	Piper	. ,,	85
Huegelii, Schott		"	494	Neesii, Miq	, ,,	81
Kænigii, Schott			496	sumatrana, Miq	••	81
7 10 11 01 144		"	496	Wallichii, Miq		81
	•••	"	495	Cubonarmen malestra Tons		587
ovata, Schott	•••	"	493	Cubospermum palustre, Lour.		221
	•••	"		Cucubalus, Linn		
	•••	"	494	bacciforus, Linn	, ,,	222
Rozburghii, Dalz. & Gil	bø.	"	494	Behen, Linn	, ,,	218

1 7-	1 Da	. I Wal Barra
(lu au 11 m -	ol. Page i. 33	
O		1 6 1 . 7
Onemmia Time		(function 307-11 /71/7
acutanaulus Wall	210	100
africanus Tindl	" Q15	
Charta Wall	. got	manulancia D Don RAT
aiaatmiaatus Otsales	΄ 49/	1 7 7 140
Citavilla DC	691	One of the state o
Cologuathic Timm	, Bac	0007
	210	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	890	
Commin Wall	" ear	
Handenishii Do-lo	. 620	
Hardwickii, Royle ,		1 1 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
integrifolius, Roxb ,	620	TT 10 1 171 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	. 623	
maderaspatanus, Linn ,	,	
	, 619	
Melo, Linn ,	, 620	
	, 609	
	, 620	1 •
prophetarum, Linn ,		
	, 619	l literatural Di come
	, 619	1 73 73 73
	, 619	70 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
	, 620	
	, 619	
	, 619	
	,, 620	
verrucosus. Hb. Rottl ,	, 623	
	i. 62	1
	,, 622	
	,, 62	
	,, 610	
	, 60	
hispida, Wall ,	, 610	
	, 613	
maxima, Duchesne ,	,, 6 2 2	1
	,, 622	
Melopepo, Roxb	,, 62	
	,, 60	
	,, 623	1 2
	,, 62	
	,, 61	
	, 61	pyramidalis, Targ ,, 645
umbellata, Wall	,, 61	
Cucurbitacea, Wall i	i. 63	1 1 2 2
	i. 60	4 torulosa, D. Don ,, 645
Cudrania, Trecul	v. 58	
amboinensis, Kurz	,, 53	8 Cupuliferæ v. 598
Annticopa Wicht	,, 53	
javanensis, Trecul	,, 53	1
mmhassama //www.l	,, 58	9 Curata pala, Rheede iii. 648
Cudranus amboinensis, Miq.	v. 53	
D	,, 53	
sp., Rumph	,, 53	
	i. 35	Finlaysoniana, Wall ,, 279
	,, 35	

Curculigo	V ol	. Page	Curouma		Vol.	Page
graminifolia, Nimmo	. vi	. 278	Zedoaria, Roxb		. vi.	210
latifolia, Dryand	. ,,	280	Zerumbet, Roxb	•••	, ,,	210
malabarica, Wight	. ,,	279	Cuscuaria marantifolia	,		
orobioides, Gærtn	. ,,	2 79	Schott		vi.	543
P pauciflora, Moon	. ,,	279	Rumphii, Schott		,,	543
recurvata, Dryand	. ,,	278	spuria, Schott			543
sumatrana, Roxb		280	Cuscuta, Linn		i₹.	225
	i. 27	8, 280	aggregata, Roxb		,,	227
Curcuma, Linn	. vi	. 209	anguina, Edgew		٠.,	226
seruginosa, Roxb	. ,,	212	anguina, Edgew arabica, Wight			226
albiflora, Thw	•	215	Boissieri, Stucks			226
Amada, Rowb		213	brevistyla, A. Rich			227
amarissima, Rosc		212	capillaris, Edgew			227
angustifolia, Rosb		210	capillaris, Wall			227
angustifolia, Dalz. & Giba		210	capitata, Roxb			227
aromatica, Salisb		210	carinata, Br		"	227
attenuata, Wall		218	chinensis, Lumk			226
cæsia, Rogb		212	ciliaris, Hohen		"	227
Careyana, Wall		225	elatior, Chois		,,	226
caulina, Grah		224	europæs, Linn		"	227
coccinea. Wall		. 216	gigantea, Griff			226
comosa, Rosb	•	211	grandiflora, Wall		"	226
cordata, Wall	•	216	Hookeri, Sweet		"	226
cordifolia, Roxb	••	216	hyalina, Roth		"	226
decipiens, Dals	•••	215	hyalina, Wight		"	227
elata, Roxb	•••	211	macrantha, G. Don	•••	"	226
erubescens, Wall		213	major, C. Bauh	•••	"	227
ferrugines, Rosb		213	minor, C. Baub	•••	. "	227
glaucophylla, Wall	• • • • • • • • • • • • • • • • • • • •	224	oxypetala, Boiss			226
grandiflora, Wall	•••	216	planiflora, Tenore		"	227
Kunstleri, Baker		214	reflexa, Rowb		"	225
Kurzii, King	••	216	sulcata, Roxb	•••	"	227
latifolia, Rosc	••	211	sulcata, Wall		226,	
leucorhiza, Rowb	• • • • • • • • • • • • • • • • • • • •	212	verrucosa, Sweet	•••	iv.	226
longa, Linn		214	CUSCUTEÆ	•••	iv.	180
longa, Wall		210	Cussambium glabrum, B		i.	681
longifora, Salisb		213	pubescens, Ham	•••	"	681
longifolia, Wall		246	spinosum, Ham			681
montana, Rosc	"	214	Cyamopsis, DC	•••	iï.	92
musacea, Wall	,,	225	psoralioides, DC	•••		92
neilgherrensis, Wight	"	210	Cyamus mysticus, Salisb.		ï.	116
officinalis, Salisb,	,,	211	Nelumbo, Sm			116
oligantha, Trim	"	215	Cyananthus, Wall		iii.	433
ornata, Wall		211	barbatus, Edgew	•••	"	434
parviflora, Wall	"	215	Hookeri, Clarke	•••		435
petiolata, Rowb	"	216	incanus, Hk. f. & T	•••	",	434
plicata, Wall)))1	213	inflatus, Hk. f. & T	•••	"	435
Pseudy-montana, Grah	"	214	integer, Wall		"	484
maniferate Donk	• • • • • • • • • • • • • • • • • • • •	214	34 14 11 TTT 11	•••	•••	434
Roscoeana, Wall	"	216	linifolius, Wall linifolius, Hk. f. & T.	•••	"	434
		220	lobstus, Wall	•••	>>.	488
	"	218	microphyllus, Edgew.	•••	"	434
	"	213	pedunoulatus, Clarke		"	434
rubricaulis, Link speciosa, Link	"	211	TT: A A M	•••	"	435
1 11 0 70771	"	216	A	•••	iŸ.	371
strobilifers, Wall	"	216	2 (2.100	•••		371 371
strobilina, Wall	. "	210	M Mi	•••	"	665
Zedoaria, Rosc	**	210	Cyananthus, Miers	•••	₹.	500

Cyananthus Vo	l. Page	Cyanotis	W-1	D
pusilla, Miers	~~~	an Wall	voi. Vi.	Page 385
Cyanitis sylvatica, Reinw ii		Champetic Minns		
P Cyanodaphne cuneata, Bl. V		manufacture Military		666
Cyanopis decurrens, Zoll ii	. 234	Cyanthillium, lapsu Cynan		000
Perigeroides, DC ,	344	AL 2112	. iii.	235
pubescens, DC iii 23		muhanaama Di		285
villosa, DO iii		villosum, Bl		235
Cyanospermum javanicum,		Cyathidium taraxicifolium	• ,,	200
W:-	. 220	Lindl		869
tomentosum, W. & A	999	Cyathocalyx, Champ	•	58
Cyanotis, D. Don v		? Maingayi, Hk. f. & T		58
and a sound sound. That he	998	martabanious, Hk. f. & T		53
amaahmaddaa Olauka	996	eylanicus, Champ	••	58
- '11 '- D 0- G	900	Oysthocline, Cass	• • • • •	246
hambata D Day	995	flava, Clarke		246
Dunmanniana Wilmha	995	Lawii, Dalz. & Gibs	••	246
ann ann ann à Manala	990	Lanie Wicht	•••	246
0.1.14	905	Inten Laur		246
	385	I Immene Mana		246
am am 11 a 4 a 17 41	990		• • • • • • • • • • • • • • • • • • • •	246
	387	Cyathopus, Stapf vii.	ം	
7.1	387	sikkimensis, Stapf		240
disrumpens, Hassk vi. 38		Cyathorhachis Wallichiana,	• •	210
		Maga		101
0 1 1 0 1 14 - 2	387	O-41-4		57
		!!3!A	_	57
		Omeshale Tarra	•	722
	885	annisata Mar		722
hirtella, Miq ,,	885	annidada Mh		723
hispida, Dalz "	385		••	723
Hugelii, Hassk ,, ,,	389	1.1	• • •	728
incerta, Hassk ,,	889	autionina Man	•••	724
karliana, Hassk ,,	388	mmundanada D1		728
kewensis, Clarke ,,	387	1 10	••	723
lanceolata, Wight "	887	O	••	722
Lawiana, Wight ,,	886		**	722
longifolia, Wight ,,	389	Cybbanthera connata, Ham.		269
nilagirica, Hassk "	385			129
nobilis, Hassk ,,	385	Oybele, Falo		129
nodiflora, Clarke "	884	a	•••	655
papilionacea. Schultes f. "	887		₹.	656
piloss, Schultes f "	886	www.m. Wannah		657
pilosa, Wight "	385	Daddamad Dam		658
racemosa, Clarke ,,	888	70. 2.2		656
rosea, Wight "	386	-9		656
sarmentosa, Wight "	386	-1112- TO		657
? sericea, Hassk ,,	886			657
Stocksii, Hassk "	386	7	••	657
Thomsonii, Hassk ,,		7 1	•••	657
Thwaitesii, Hassk ,,	388 386		•••	657
tuberosa, Schultes f "	887		•••	656
vaga, Schultes f ,,	385	madagascariensis, Miq	••	657
vaginata, Wight "	387	pectinata, Griff	••	656
villosa, Schultes f "	388	Pluma, Bull revoluta, Bedd	"	658
vivipara, Dals "	386		••	656
Wightii, Clarke "	907	revoluta, Thupb Rumphii, Miq	•••	657
zeylanica, Hassk ,, sp., Hk. f. & T vi. 886	90/	Scratchleyana, F. Muell.		657
sp., Hk. f. & T vi. 886	, 901	Sorwichteyunu, P. Musii.	"	

_					
Cycas		Page	Cylicodaphne	Vol.	
siamensis, Miq		657	feruginea, Moissn	▼.	160
sphærica, Roxb	• ,,	656	? floribunda, Bl	,,	177
squamosa, Lodd	. ,,	656	Gardneri, Meissn	,,	173
squarrosa, Stend	• ,,	656	? Hookeri, Meisan	,,	164
Thouarsii, Br	. ,,	656	infectoria, Bl	*** ,,	117
Wallichii, Miq	• ,,	657	myristica folia, Meissn.	• • • • • • • • • • • • • • • • • • • •	172
sp., Griff	: '	657	nitida, Meissn	••• ,,	174
Cycles, Arn	. 1.	104	oblonga, Meissn	*** ;;	168
Arnottii, Miers	• "	104	obtusifolia, Nees	· · · ·	171
barbata, Miers	٠,,	104	rigida, Meissn	,,	176
Burmauni, Miers	. ,,	104	sebifera, Bl	170	180
Burmanni, Arn	• "	104	Thwaitesii, Meissn	v. 173,	
debiliflora, Miers	• • • • • • • • • • • • • • • • • • • •	104	Walkeri, Meissn	▼.	174
laxiflora, Miers	• "	104	Wightiana, Nees	,,	177
peltata, Hk. f. & T	••	104	zeylanica, Moissn		176
populifolia, Hk. f. & T	• ,,	105	Cylindrochilus pulchellus		
versicolor, Miers	• ,,	104	Cylindrolobus, Bl	V.	786
Cyclocampe waigiouensis,	_ •	000	Cylindropus junciformis,	••	692
Stend	. vi.	673	Cylista, Ait	ii.	219
Cyclocarpa waigiouensis, Miq	. Vi.	673	albiflora, Sims	,,	223
Cyclocodon, Griff			reticulata, Heyne	••• ,,	220
adnatum, Griff	•	436	scariosa, Ait	,,	219
distans, Griff	••	486	suaveolens, Grah	••• 19	220
lancifolium, Kurs	. ,,	436	tomentosa, Roxb	"	223
parviflorum, Hk. f. & T	• ,,	436	Cymaria, Benth	iv.	704
truncatum, Hk. f. & T	. ,,	486	dichotoma, Benth	,,	705
Cyclodiscus latifolius, Klots	. ▼.	78	elongata, Benth	;;	705
toment sus, Klotz	•••	73	Cymbachne ciliaris, Retz	_	210
CYCLOLOBEE		1	Cymbidium, Swartz	vi.	.8
Cyclostegia strobilifera, Bent		645	Paffine, Griff	••• ,,	15
Cyclostemon, Bl	, ▼.	389	affine, Warn	*** ,,	15
assamious, Hk. f	• 97	342	Alagnata, Ham	,,	52
calocarpus, Hk. f		343	alatum, Roxb	*** ,,	19
confertiflorus, Hk. f	• ,,	341	aloifolium, Sw	,,	10
Curtisii, Hk. f	. ,,	843	aloifolium, Heyne	••• ,,	78
cuspidatus, Bl	• ,,	486	aloifolium, Lodd	*** ,,	10
eglandulosus, Kurs	• ,,	841	alrifolium, Wall	,,	11
elliptious, Hk. f	. ,,	342	aloifolium, Wight	,,	11
Griffithii, Hk. f	. ,,	840	aphyllum, Sw		739
Helferi, Hk. f	• ,,	843	assamicum, Linden	vi.	14
indious, Muell	. ,,	340	bambusifolium, Roxb.	▼.	857
lancifolius, Hk. f	. ,,	840	bicolor, Lindl		11
leiocarpus, Kurz	- ,,	343	P bituberculatum, Hk.	₹.	696
longifolius, Bl	- 11	841	carnosum, Griff	▼i.	14
macrophyllus, Bl	• ,,	840	chloranthum, Lindl	••• ,,	14
macrophyllus, Bedd	. ,,	341	cochleare, Lindl	••• ,,	15
? macrophyllus, Kurs	. ,,	341	crassifolium, Wall		10
malabarious, Bedd	. ,,	841	cyperifolium, Wall		13
nervosus, Hk. f	• ••	342	Dayanum, Robb. f		12
subsessilis, Kurs	. ,,	842	densistorum, Griff		14
zeylanicus, Baill		841	Devonianum, Past		10
Cydonia, Tourn	. ii.	368	eburneum, Lindl	•••	11
indica, Spach	•	369	elegans, Heyne	••• ,,	44
lusitanica, Mill	• ,,	369	elegans, Lindl	*** ,,	14
Sumboshia, Ham	•	869	ensifolium, Sw	*** ,,	13
vulgaria, Pers	•••	369	Perectum, Wight	,,	11
Cylicodaphne, Nees	. ▼.	1 64	erythræum, Lindl	,,	13

		. ~ .	
	l. Page	Cymbopogon	Vol. Page
Finlaysonianum, Lindl v		glandulosus, Spreng	vii. 218
	, 9	Iwarancusa, Schult	
giganteum; Wall		laniger, Duthie	
giganteum, Lindl vi.	12, 14	Cyminosma Ankenda, Gærtn.	i. 498
grandiflorum, Griff v	i. 12	pedunculata, DC	, ,, 498
hæmatodes, Lindl	, 13	Oymodocea, Kan	
Hookerianum, Rohb. f	10	æquorea, Kunth	570
- · '	. 841	australis, Trim	7 770
imbrigatum Dorb	946	-:12 2/2 1	
	i. 56	i-maid-lie As-l	E770
	r. 676		
		serrulata, Asch. & Magn	
			. iv. 2, 16
	. 815	Cynanchum, Linn	
	i. 9	acuminatum, Ham	
	, 9	acuminatum, Thunb	
	, 47	acutum, Linn	
longifolium, D. Don	, 13	alatum, W. & A	. ,, 23
Tandanin Bakk #	, 13	angustifolium, W. & A	0.4
macrorhizon, Lindl		Arnottianum, Wight	
Manuall Dakk A	, 10	asthmaticum, Ham	
76	, 15	auriculatum, Royle	0=
	" 15	auriculatum, Ham	94
	" 97	bracteatum, Thunb	
		Callialana Trans	9.4
	710		. "
		cordifolium, Retz	
Parishii, Robb. f v		corymbosum, Wight	
	, 11	cuspidatum, Thunb	
	, 10	Dalhousise, Wight	
præcox, 8m	, 194	$ \text{deltoideum, } Hk. f. \dots \dots$,, 24
	,, 63	echinatum, Thunb	. "20
pubescens, Lindl	, 11	extensum, Ait	ec.
Clark i c. ma U n ma	, 58	flavens, Thunb	41
	, 18	flavum, Thunb	42
-this manage 11h f	, 9	glaucum, Wall	ິ່ ດວ
atarana limal	14	gracillimum, Wall	61
	7. 829) W1-: D1. C	. ,, or
	ri. 193	17	
	10	1 1	" og
syringodorum, Griff,	94		. " 60
	"	inconspicuum, Griff	42
tenuifolium, Wight tenuifolium, Willd	, 22	indicum, Herb. Burm	
	" 2 6 '	inodorum, Lour	
	,, 52	Ipecacuanha, Willd	
	,, 52	Jacquemontianum, Dene	
	" 9	Kenouriense, Wight	
tricolor, Mig	,, 11	longifolium, Mart	
triste. Roxb	" 22	micranthum, Thunb	. ,, 42
Autodo Wimba	,, 24	nanum, Ham	. 10
triste, Willd vi.	28, 2 5	ovalifolium, Wight	60
variciferum, Rohb. f		? ovatum, Thunb	΄ ″ Δο
	10	peuciflorum, Br	, ,,
777 77 / . 1. 11. T 2 31	" 13 11	made marindar Mhamb	. ,, 98
		T 19 1 10 10 10 10 10 10 10 10 10 10 10 10 1	, , , ,
			77 98
	ii. 2 02	reticulatum, Ham	' "
	, 203	reticulatum, Retz	. " 02
	,, 203	Roylei, Wight	04
	, 317	tingens, Ham	
circinnalus, Hooh st.	,, 203	tomentosum, Lamk	. ,, 26

Cynanchum	Val 1	Dage I	Cynoglossum	Vol. I	Da ma
Vincetoxicum, Pers	Vol. 1	22	marifolium, Roxb	iv.	
		45	? membranaceum, A. DC.		157
	"	45	mioranthum, Desf	"	156
	"	28	micranthum, Dalz. & Gibs.	••	156
Wallichii, Wight	"	25		"	157
Wilfordi, Maxim	"	20	microcarpum, Kerner	"	158
Cynanthillium, vide Cyan-		235	microglochin, Benth	,,	158
thillium, Bl			nervosum, Benth	>>	155
	225,		ovatum, Moon	"	158
Cynoctonum alatum, Done.	iv.	23	petiolatum, A. DC	75	167
angustifolium, Done	17	24	prostratum, Ham	"	
Blumei, Done	"	28	racemosum, Roxb	"	156
Callialata, Done	"	24	? Ritchei, Clarke	"	157
corymbosum, Done	"	24	Roylei, Wall	"	161 156
formosanum, Maxim	"	23	stellulatum, Wall	"	161
ovalifolium, Dcne	"	23 23	uncinatum, Benth vesiculosum, Wall iv.	156,	
pauciflorum, Done	"	23			157
Wallichii, Done	.":	288	Wallichii, G. Don	ì♥.	157
Cynodon, Pers		288	seylanicum, Thunb	"	151
dactylon, Pers		290	zeylanicum, Wight	157,	
elongatus, Trin	••	288		ii.	267
erectus, Presl filiformis, Voigt	••	288	Cynometra, Linn bijuga, Spanog		267
		297		"	268
2 1 / . 3377111.3		288	cauliflora, Linn cauliflora, Wall	"	267
42 IT D #	•••	288	1 12 - 12 - 1 - 12 - 1	• 11	267
March Cham		298		"	267
1 337/11.3		288		"	268
7 4 7 7		298		"	267
737211.3		288	A	"	267
71		288	·	vii.	807
T		288			296
sarmentosus, B. F. Gray	79	288	Ara, Ham	**	294
4 17 4 337:11.3		288	aurous, Linn	"	807
ternatus, A. Rich	"	17	Cavara, Ham	"	296
rirgatus, Nees vii. 288			ciliaris, Bottl	"	296
Cynoglossum, Linn	•	155	coracamus, Linn	"	294
anchusoides, Lindl		161	coromandelianus, Rottl	"	297
calycinum, Wall		157	cristatus, Linn	"	307
calycinum, Wall canescens, Wall		157	distachyus, Rottl	"	296
canescens, Willd		156	durus, Forsk		325
colestinum, Lindl	•••	160	durus, Linn	"	335
denticulatum, A. DC	-	157	filiformis, Vahl	"	299
diffusum, Boxb	•	167	indicus, Linu	"	294
Edgeworthii, A. DC		158	Macara, Ham	"	296
Emodi, Schonw	••	161	monostachyus, Vahl	"	298
furcatum, Wall	• • •	155	paniceus, Linn	"	245
glochidiatum, Wall		156	paniculatus, Roxb	"	297
glochidiatum, Benth		157	? pectinatus, Lamk	"	294
glochidiatum, Dals. & Gibe	. "	157	penicillatus, Vahl	"	293
grandiflorum, Benth		159	retroflesus, Vahl	",	297
Heynei, G. Don		156	Cyperacea, Griff	vi.	590
hirsutum, Jacq		156	_ Wall	99	691
lan ceolatum, Forsk	*-	156	CYPERACE	Ψi.	585
lanceolatum, Heyne		156	CYPERE	vi.	586
laxum, G. Don	-7	161	Cyperorchis, Bl vi.		178
longiflorum, Benth		159	cochleare, Benth	vi.	15
macrostylum, Bunge	"	161	elegans, Bl	"	14

Cyperorchis		Wal .	Dama	Cyperus		V ∧ì	Page
Mastersii, Benth	•••	vi.	Page 15	compressus, Linn		vi.	Page 605
? Wallichii, Bl	•••	,,	13	concolor, Stend	•••	"	590
Cyperus, Linn		νi.	597	congestus, Hayna	•••	"	595
acerosus, Roxb	• • • • •	22	617	conglomeratus, Rottb.	•••	"	602
acuminatus, Roxb	•••	"	596	conglomeratus, Thw.		"	603
albidus, Heyne	•••	"	615	conjunctus, Steud	•••	**	615
alopecuroides, Boeck.		. • •	617	Coracana, Heyne	•••	vii.	295
alopecuroides, Heyne		,,	595	coromandelinus, Boeck.	•••	٧i.	589
alopecuroides, Rottb.	•••	,,	595	coromandelinus, Spreng		"	601
ulopecuroides, Roxb.		97	617	coronarius, Kunth	•••	"	619
amabilis, Vahl	•••	"	598	corymbosus, Rottb	•••	**	612
amoyensis, Hance	•••	"	610	corymbosus, Kosu	•••	"	681
Andersonianus, Boeck.	• • • • •	,,	621	corymbosus, Roxb	•••	**	592
angulatus, Nees	•••	"	59 3	corymbosus, Wall	•••	"	612
angulatus, Strach	•••	,,	590	cruentus, Boeok	•••	"	620
angustifolius, Ham.	•••	,,	599	cruentus, Roxb	•••	"	590
aphyllus, Boeck	•••	"	590	curvulus, Boeck	•••	"	608
arenarius, Retz	•••	,,	602	cuspidatus, H. B. K.	•••	**	598
arenarius, Hance	•••	,,	615	cylindricus, Boeck	•••	"	619
arenarius, Heyne	•••	,,	601	cylindrostachys, Boeck.	•••	**	622
arenarius, Prain	•••	**	603	dehiscens, Nees	•••	"	618
arenarius, Wight	•••	,,	606	densus, Br	•••	"	603
aristatus, Rottb	•••	"	606	denudatus, Heyne	:	**	614
articulatus, Linn		"	611	diaphanira, Steud	•••	"	606
ater, Dals. & Gibs.	•••	"	592	diaphanus, Schrad	•••	"	590
Atkinsoni, Clarke	•••	"	603	difformis, Linn	::· ,	,,,	599
atratus, Steud	•••	,,	590	diffusus, Vahl			604
atro-ferrugineus, Steud	• • • • •	,,	592	diffusus, Kunth	•••	₹i.	604
aureus, H. B. K	•••	"	598	diffusus, Boxb	•••	,,	662
auricomus, Benth	•••	,,	618	digitatus, Rozb	•••	"	618
auricomus, Sieb	•••	,,	618	digitatus, Nees	•••	"	617
Babakan, Stoud	•••	99	610	dilutus, Vahl	•••	"	624
Babakensis, Steud.	•••	91	610	diluvialis, Schult	•••	"	59 5 611
Baccha, Kunth	•••	,,	593	diphyllos, Benth	•••	"	
Bacha, Ham	•••	"	610	diphyllus, Retz	•••	"	612 597
bengalensis, Clarke	•••	"	610	distachyos, Allioni	•••	"	607
bengalensis, C. Spreng.	• • • • • • • • • • • • • • • • • • • •	"	612	distans, Linn. f	•••	"	592
bicarinatus, Heyne	•••	99	592	divaricatus, Ham	•••	"	617
biglumis, Clarke	•••	91	622	dives, Delile	•••	"	609
bromoides, Willd	•••	"	593	Donianus, Dietr	vi.	507	620
brunnescens, Boeck.		,,	619	dubius, Bottl		vi.	603
bulboso-stoloniferus, Ste	oua.	99	615	effusus, Rottb			618
bulbosus, Vahl	•••	"	611 598	elatus, Linn ,	•••	"	617
canescens, Heyne	•••	"	623	elatus, Heyne elatus, Rottb	•••	"	607
canescens, Vahl	•••	"	589	-7 -4 TD1-	•••	"	619
capillaris, Hochst	•••	"			•••	77	603
capillaris, Koen	•••	"	691 718	elegans, Kunth elegans, Linn	•••	.**	604
caricinus, D. Don	•••	"	610	elegans, Linn eleusinoides, Kunth	•••	,,	608
carnosus, Heyne	•••	"	598		•••	"	619
castaneus, Willd	•••	"	599		•••	**	613
Castaneus, Hance	•••	"	597		•••	"	592
Cephalotes, Vahl	•••	"	619	97 47 77 1.7	•••	**	590
chilensis, Boock	•••	"	624		•••	99	616
compactus, Retz	•••	"	608		•••	"	600
complanatus, Wight complanatus, Willd	•••	"	616		vi. /	598.	617
complanatus, willia	••	"					608
compositus, Br	•••	"	595	exaltatus, Strach	•••	V	~~

0			_		_		_
Cyperus		Vol.		Cyperus		ol. I	
extensus, Heyne	•••	vi.	617			595,	
fastigiatus, Heyne	•••	,,	608		•••	-	617
fastigiatus, Rottl	•••	,,	619		•••		606
Fenzlianus, Steud	•••	"	615	Iria, Thw		. ,,	607
ferax, Rich	•••	"	624	ischnos, Schl	• • •	,,	623
ferox, Vahl	٠	**	624	Jacquini, Schrad			607
ferrugineus, Poir	••	"	59 8	i-maniana Mia			594
Fieldingii, Steud		••	60L	jeminicus, Heyne vi. 59		8 15 .	616
filiformis, Heyne	₹i.	589,	592	l innining Date			611
fimbriatus, Nees		vi.	609	jeminicus, Rottb		,,	602
flavescens, Linn		,,	589	inmaifoline Wlain	•••	"	615
flavescens, Thw	•••	,,	591	Dank Dank	•••	"	597
flavicomus, Torr	•••	"	594	Tour alter Landy Make	•••		592
flavidus, Retz	•••	"	60Ò	1 77 1	· · ·	"	594
flavidus, Done			591	Wishington Hashes	• • • •	"	625
flavidus, Heyne		,,	594	1		,,	612
fluitans, Ham	•••	,,	598	Trumit Game	···•	"	607
B		••	599	17	•••	"	604
	•••	"	608	1	•••	"	62 0
	•••	"	592		• • •	••	
geminatus, Heyne	•••	"	611	1 1	•••	"	596
geminatus, Kon	•••	,,	606		•••	"	604
glaber, Linn	•••	"			•••	"	591
globosus, Allioni	•••	"	591		•••	"	615
glomeratus, Linn	•••	"	607		•••	"	596
glomeratus, Klein	•••	"	625		• • •	,,	59 0
Goeringii, Steud	•••	"	599		•••	"	615
gracilis, Heyne	•••	**	600		•••	,,	602
graminicolor, Steud.	•••	,,	607	leucocephalus, Wight	vi.	597,	603
graminifolius, Poir.	•••	"	600			٧i.	615
Griffithianus, Boeck.		,,	609	lividus, Heyne	•••	,,	592
Griffithii, Stead		"	603	1 1: E-1/ D	:	"	603
grossarius, Heyne		,,	59 0	lamona Time		,,	614
Gula-Methi, R. & S.		,,	612	Zanama Dalaan	•••	"	616
gymnos, R. & S		"	611	7		"	594
Haspan, Linn		"	600	1 1	٠٠.	"	614
Haspan, Benth	•••	,,	600	In aide lan Whain		"	616
Haspan, Rottb		"	601	lumidus Horno			592
Haspan, Wight		,,	601		•••	. **	613
hebes, Steud	•••	"	609	manage Mia		"	605
Helferi, Boeck	•••	"	604	managada akana Waki	•••	"	594
hexangularis, Wight	•••		601		•••	"	623
hewastachyus, Nees	•••	"	616	malaccensis, Lam		"	608
hexastachyus, Rottb.	•••	"	615	marginellus, Nees	•••	"	609
Heyneanus, Boeck		"	609	7	•••	"	617
Heynei, Boeck	•••	"	610	manimus Donb	•••	"	619
TT . 1 . A . A A	•••	•••	594		•••	"	591
Lauratura Vanath	•••	"	609	membranaceus, Vahl	•••	"	605
TT 1 1 A	•••	"	592		•••	"	
Hookerianus, Arn	•••	"	592 597	microcarpus, Boeck.	•••	"	601
Hookerianus, Thw	•••	***		microiria, Steud	•••	"	606
hyalinus, Heyne	•••	"	623	microlepis, Baker	•••	,,	606
hyalinus, Vahl	•••	"	591	mitis, Stend	•••	**	616
incurvatus, Roxb	•••	**	608	mæstus, Knnth	•••	_"_	608
indicus, Boeck.	•••	"	619		₹ĺ.		597
indicus, Pers infra-apicalis, Nees	•••	"	649	monophyllus, Vahl	***	₹i.	612
	•••	99	608	monostachyus, Idnn.	•••	33	649
intermedius, Steud.	•••	99	590	Monti, Linn. f	•••	"	594
inundatus, Nees	•••	99	593	mucronatus, Heyne	•••	"	596

Cwnerna			_		_
Cyperus mucronatus, Moritz		Vol. 1 ▼i.	Fage 591		Page 600
mucronatus, Rottb	•••		596	Pes-avium, Bertol vi.	621
multispicatus, Boeck.	•••	**	604	pictus, Wall ,,	
	•••	"	662	pilosus, Vahl vi. 595	
musarius, Ham	•••	"	608	piptolepis, Steud vi.	609 618
mysurensis, Heyne	•••	"		platyphyllus, R. & S,	
natins, Ham	•••	"	597 618	platystylis, Br ,,	598 592
Neesii, Kunth	•••	"	618	plenus, Heyne ,,	598
Neesii, Thw nigro-viridis, Thw	•••	**	603	pleuranthus, Nees "	592
	•••	**		polystachyus, Br "	
nilagiricus, Hochst.	•••	"	592	polystachyus, Rottb. vi. 609	
nitens, Retz	•••	,,	601	polystachyus, Strach vi.	592
nitens, Rottb	•••	,,	601	procerulus, Nees ,,	616
nitens, Rottl	•••	"	601	procerus, Rottb ,,	610
nitens, Vahl nitens, Wall	•••	"	591	procerus, Roth	609
	•••	,,	601	procerus, Roxb. vi. 593, 608	
nivous, Retz	•••	"	601	proteinolepis, Steud vi	
niveus, Hoyne	•••	<i>"</i> .	59 6	Pseudo-bromoides, Boeck. ,,	590
nudus, Roxb	₹i.	611,		pubescens, Stoud ,,	653
nutans, Vahl	•••	٧í.	607	pubisquama, Steud ,,	604
nutans, Presl	•••	"	607	pulchellus, Br ,,	602
Oatesii, Clarke	•••	"	618	pulcher, D. Don ,,	619
obliquus, Nees	•••	"	61 0	pulcherrimus, Willd "	600
obscurus, Nees	•••	"	617	pulvinatus, Nees & Mey. "	591
obstinatus, Steud	•••	,,	591	pumilus, Heyne "	616
ochreoides, Steud		"	615	pumilus, Linn ,,	591
odoratus, Burm	•••	"	617	pumilus, Nees	591
odoratus, Forst		99	624	pumilus, Rottb ,,	59 0
odoratus, Linn	vi.	592,	608	punctatus, Roxb ,,	591
oleraceus, Roxb		vi.	611	puncticulatus, Aitch ,,	594
ornatus, Br	•••	,,	610	puncticulatus, Steud ,,	595
oryzeticola, Steud		11	617	puncticulatus, Vahl ,,	593
ovularis, Boeck	•••	"	622	pungens, Boeck ,,	602
pachyrrhizus, Nees	•••	"	603	pusillus, Vahl ,,	619
pallescens, Boiss		"	615		623
pallidus, Heyne		12	598	pygmæus, Retz vi.	619
Pangorei, Ham	•••	"	609	pygmæus, Rottb ,,	596
Pangorei, Heyne	•••	"	613	quinqueflorus, Hochst ,,	610
Pangorei, Retz	•••	"	616	quinqueflorus, Stead ,,	618
Pangorei, Rottb	•••	"	612		617
Pangorei, Roxb	•••		608	racemosus, Retz vi.	618
Pangorei, Wight		"	613	madiana Nasa & Mass	605
paniceus, Boeck	•••	"	621	radians, wees of mey,	617
paniculatus; D. Don	•••	"	609	undiana Wash	605
paniculatus, Rottb	•••	"	592	D.L Daine	59 Q
Panimotha, Ham	•••	. "	609	D Ann. Mann	616
parviflorus, Heyne	•••	` "	617		619
parviflorus, Neas		"	607	Dandalii Vmush	616
patulus, Kitaib	•••	"	606	1	614
pauciflorus, Steud		93	609	makeen Jeen Darak	616
pauper, Clarke	•••	"	590	14 3 1) 1-	615
pectinatus, Roxb	•••	99	601	rotundus, Kunth vi. 611	, 615
pectiniformis, Nees	vi.	605,			
pectiniformis, R. & S.		vi.	601		, 616
man make Danah	•••		624		
	•••	"	623	Dankson L. Wasa	619
pertenuis, Bojer	•••	"	616	Manufact Amm	617
pertenuis, Roxb		"	612	mulderen dere Wernelle	601
granting makes	•••	"	V-6	ruoicunaus, Lunin "	

C			_	I Companyo	
Cyperus rubicundus, Vahl			Page 601	Cyperus Vol. Po tortuosus. Roxb vi. 5	91
	•••	Ţì,	590		49
sanguinolentus, Vahl	•••	"	612	Aminaulus D. Dom	19
scariosus, Br	•••	,,	608	Annual Managh	109
scoparius, Done	•••	"	595	Andrews Coloned "	18
semidives, Stead	•••	"		Ambanasana Datth	16
seminudus, Moritz	•••	33	606	Aubanana Daian	15
seminudus, Roxb	•••	99	612	, , , , , , , , , , , , , , , , , , , ,	04
semiteres, Heyne	•••	"	592	, , , , , , , , , , , , , , , , , , ,	21
serotinus, Rottb	•••	"	594	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	19
selaceus, Rotz	•••	"	629	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	22
setifolius, D. Don	•••	"	619	amountaine, maid:	
silletensis, Nees	•••	"	600		17
silletensis, Thw	•••	"	600	umbellatus, Thw vi. 621, 6	
sinensis, Dob	•••	"	605	4 10	93
solutus, Stend	•••	"	599	, , , , , , , , , , , , , , , , , , , ,	17
songaricus, Karel	•••	"	606	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	309
sorostachys, Boeck	•••	"	602	, , , , , , , , , , , , , , , , , , , ,	18
spadiceus, Heyne	•••	,,	610	, , , , , , , , , , , , , , , , , , , ,	06
spaniophyllus, Steud.	•••	"	609	, ,,	17
speciosus, Heyne	•••	,,	595		317
spicatus, Heyne	•••	"	617	viridis, Roxb ,, 6	305
spinulosus, Roxb	`	"	624	viscosus, Aiton ,, 6	604
spongioso-vaginatus,				vulgaris, Sieb ,, &	91
Boeck		,,	619	Wallichianus, Spreng ,,	319
squarrosus, Linn	vi.	606,	623	Wallichii, Nees ,, 6	308
squarrosus, Roxb		₹i.	596		609
squarrosus, Trim	•••	"	598		318
stenostachyus, Benth.	•••	"	614	Wightii, Nees " 6	301
Steudelianus, Boock.		"	622		808
stoloniferus, Retz		-	615		313
stoloniferus, Nees		"	611		06
		"	589	sp., Hk. f. & T vi. 608, 6	
	•••	"	601	sp., Wall. vi. 590, 591, 592, 5	
adam adam a Vincen	• ••	"	592	595, 599, 600, 601, 602, 603, 60	
	•••	,,	593	605, 606, 607, 609, 611, 614, 6	
TTT	•••	"	591	617, 618, 619, 623, 624, 640, 6	
. A	•••	"	592	680.	,
	•••	"			37A
subulatus, Steud.	•••	"	609	sp., Wight vi. 616, 6	250
subcapitatus, Clarke	•••	"	616		
subulatus, Heyne	•••	"	613		251
sulcinux, Clarke	•••	"	593	000	251
tegetiformis, Rosb.	•••	"	612	CYPRIPEDIEZ v. 668, 6	
tegetiformis, Benth.	•••	"	609	vi. 169, 1	
tegetiformis, W. Wate.	•••	"	613		169
tegetum, Rowb	•••	,,	613		174
tegetum, Wight	•••	"	59 t	, , , , , , , , , , , , , , , , , , , ,	171
tener, Vahl	•••	"	619		L70
Teneriffæ, Poir		"	60 L	concolor, Batem ,, 1	170
Tenorii, Presl		"	616	cordigerum, D. Don ,,	L70
tenuiculmis, Boeck.	•••	"	613	Crossii, Morr ,, 1	74
tenuiflorus, Balf. f	•••	"	615	Drurii, Bedd ,, 1	L72
tenuistorus, Roxb	•••	"	616	elegans, Rchb. f	L 69
tenuistorus, Royle	•••	"	615		178
tenuispica, Steud	•••	"	601	Godefroyi, G. Lebuut,	171
teretifructus, Stead.		"	592		171
Thomsoni, Bosck	•••	"	608		172
tortuosus; Kosa	•••	"	592		169
, 22002	•••	"		. Andrews and an are the	

Q		C41		
Cypripedium Vol. Pa macranthon, Sw vi. 1	Mge	Cyrtophyllum	VOI.	Page 85
				85
	71	peregrinum, Reinw		89
	74	Cyrtosia altissima, Bl	vi.	88
	78	javanica, Bl Lindleyana, Hk. f. & T	"	88
	74		**	550
Ontroduce Dall 4 " 1/	74	Cyrtosperma, Griff	٧i.	551
	72	lasioides, Griff	"	414
	78	Cyrtostachys, Bl	VĪ.	414
	73	Lakka, Becc	"	414
727 77	70	Rendah, Bl	."	
	73	Cyrtotropis carnea, Wall	11.	188
	71	Cyssopetalum javanum, Turcz.	ii.	696
	74	Cystacanthus, T. Anders	ĭ▼.	518
~	71	cymosus, T. Anders	"	514
	89	insignis, Clarke	"	514
1.	74	paniculatus, T. Anders	"	514
	70	pulcherrimus, Clarke	"	514
, , , , , , , , , , , , , , , , , , ,	70	Cystidianthus campanulatus,	_	
bicolor, Jack ,, 37	75	Hassk	iv.	62
Blumeana, Clarke ,, 87	75	Cystorchis, Bl vi	. 97,	
decurrens, De Vr ,, 37	75	fusca, Benth	vi.	112
	75	javanica, Bl	,,	97
	75	variegata, Bl	,,	97
humilis, Bl ,, 37	75	Cytheris (lapsu Citheris)		
	72	cordifolia. Lindl	₹.	818
	75	Griffithii, Wight	. 11	852
	75	CYTINACEÆ	v.	71
pilosa, Bl , 37 Cyrtandracea, Griff iv. 340, 34	11.	Cytisus Cajan, Linn	ii.	217
342, 358, 362, 368, 87	73	flaccidus, Royle	**	68
	70	lanuginosus, Royle	"	64
non-simple Doubl 95	70	Pseudo-cajan, Jacq	"	217
annumlana Olamba 95	71	roseus, Camb	"	64
dannana 7.11 " 95	70	sericeus, Willd	. "	110
annum di Annu Clauba	71	Czernya arundinacea, Presl		304
Cyrtoceras (lapsu Crytoceras)		0.0 y , _ 10		• • •
	52	Dacrydium, Soland	¥.	648
nodonum Dunn	52	elatum, Wall	"	648
Cyrtonema convolvulacea,	-	Dactylicapnos thalictrifulia,	"	
· · · · · · · · · · · · · · · · · · ·	97	Wali	i.	121
diamena Diah				884
Cyrtopera bicarinata, Lindl. vi.	6	brevifolia, Kon. vii. 295,	233.	884
Danmaniana Wimbe	6		vii.	
	7	cristata, Bieb	"	
candida, Lindl	7	cylindracea, Brot		809
Anna Tindl	7	cynosyroides, Kon vii.)) 24á	
flava, Lindl ,,	6		vii.	20f
fusca, Wight ,,	6			885
Gardneri, Thw ,,	6	glomerate, Linn	"	325
laxifora, Gardn ,,		interrupta, Rottl	"	384
Mannii, Behb. f ,,	4	lagopodioides, Dals. & Gibs.	"	834
mysorensis, Lindl "	6	lagopoides, Linn	"	333
nuda, Rohb. f ,,	6	littoralis, Willd	**	808
obtusa, Lindl ,,	3	lobata, Bieb	**	
	6	madraspatensis, Roxb	**	297
rufa, Thw vi. 8,19		massaviensis, Steud	99	884
sanguinea, Lindl vi.	8	paleacea, Linn	"	806
squalida, Rohb. f ,,	6	paspaloides, Willd	**	297
Cyrtophyllum fragrans, DC. iv. 8	B 3	phleoides, Heyne	"	318

Dactylis	Vol.	Page	Dæmonorops		Vol.	Page
phleoides, Klein		313	Magii, Becc		vi.	463
pungens, Hornem		8 09	melanolepis, Mart	•••	,,	452
repens, Desf		334	micracanthus, Becc.	•••	,,	467
spicata, Brot		30 9	monticolus, Mart		,,	465
spicata, Heyne		313	nutantiflorus, Mart		,,	462
spicata, Willd		306	oligophyllus, Becc	•••	,,	470
Dactyloctenium, Willd		2 95	petiolaris, Mart	•••	"	466
ægyptiacum, Willd	,,	296	platyspathus, Mart.		,,	450
distachyum, Bojer	,,	296	propinquus, Becc	•••	"	467
Figarei, Notar	"	296	Pseudosepal, Beoc	•••	"	465
glaucophyllum, Courb	"	296	ramosissimus, Mart	•••	,,	450
meridionale, Ham	**	296	Rheedei, Mart	•••	11	452
mucronatum, Willd	"	296	Sabut, Becc	•••	"	469
prostratum, Willd	"	296	Sepal, Becc	•••	"	465
radulans, Beauv	"	296	strictus, Bl	•••	"	471
scindicum, Boiss	"	296	tabacinus, Becc	•••	"	466
	V1i.	289 14	vagans, Becc	•••	"	469
sanguinale, Vill	."	417	verticillaris, Mart	,	??	470
Dædalacanthus, T. Anders.	17.	418	Dalbergia, Linn. f	•••	ii.	230 235
Griffithii, T. Anders	"	419	acaciæfolia, Dalz	•••	"	104
macrophyllus, T. Anders. microstachyus, T. Anders.	,,	420	angustifolia, Hassk arborea, Heyne	•••	"	235
montanus, T. Anders	,,	421	arborea, Willd	•••	"	240
nervosus, T. Anders	"	418	assamica, Benth		"	235
Parishii, T. Anders	"	421	Blumei, Hasak	•••	"	234
purpurascens, T. Anders.	••	420	cana, Grah	•••	"	237
roseus, T. Anders		419	cassioides, Wall		"	237
saluccensis, T. Anders	•••	421	Championi, Thr	•••	"	231
scaber, T. Anders	"	419	confertiflora, Benth.	•••	"	233
splendens, T. Anders		418	congesta, Grah	•••	"	232
strictus, T. Anders	"	419	Crowei, DC	•••	"	241
suffrutionsus, T. Anders.		420	oultrata, Grak		"	283
tetragonus, T. Anders	,,	42 0	emarginata, Roxb		"	231
tubiflorus, T. Anders	,,	417	ferruginea, Hohen		"	234
Dæmia, Br	i√.	20	ferruginea, Roxb		,,	237
_ extensa, Br	12	20	flexuosa, Grah	•••	,,	238
Dæmonorops, Bl	₹i.	462	foliacea, Wall	•••	,,	232
angustifolius, Mart	"	464	frondosa, Roxb	•••	"	235
calicarpus, Mart	***	466	frondosa, Wall	•••	"	231
didymophyllus, Becc	,,	468	Gardneriana, Benth.	•••	"	232
fasciculatus, Mart	* **	459	glauca, Wall	•••	"	231
geniculatus, Mart	"	470	glomeriflora, Kurz	•••	"	236
grandis, Mart		463 463	heterophylla, Willd	•••	"	241 236
grandis, Kurz	••	449	hiroina, Benth	•••	"	235
Guruba, Mart hirsutus, Bl		468	hircina, Wall horrida, Grah	·	"	238
1 1 11 171	•••	461		•••	"	281
Lamalanana Vana		451	Javanica, Miq Junghuhnii, Benth	•••	"	233
Hystrix, Mart	••	468	Krowes, Boxb		**	241
intermedius, Mart		464	lanceolaria, Linn		"	235
Jenkinsianus, Mart	•••	462	lanceolaria, Moon	•••	"	252
Kunteleri, Becc	"	469	latifolia, Rozb	•••	"	281
Kursianus, Hk. f	-	468	livida, Wall	ü.		, 287
leptopus, Mart	,,	468	marginata, Roxb			245
Lewisianus, Mart	,,	465	monosperma, Dals	•••	"	237
longipes, Mart	, ,,	471	Mooniana, Thw	•••	"	252
macrophyllus, Becc	,,,	470	multijuga, Grah		"	234
			•			

Dalbergia		Vol. ∶	Page	Damnacanthus		Vol.	Page
ougeinensis, Roxb			161	indicus, Gærtn. f		iii.	
ovata, Grah		"	231	Danthonia, DC			, 42L
paniculata, Rozb		••	236	cachemyriana, J. & S.		vii.	
paniculata, Wall	ii.	233,	237	Cumminsii, Hk. f	•••	"	282
parviflora, Roxb		•••	233	exilis, Hk. f	•••	"	281
pendula, Tenore	•••	"	231	Griffithiana, C. Muell.	•••	"	282
Pseudo-sissoo, Miq	•••	"	232	himalaica, Hk. f		"	281
purpurea, Wall	•••	"	235	Kashmiriana, Duthie	•••	"	281
reniformis, Rosb	•••	"	238	leptophylla, A. Rich,	•••		287
rimosa, Rorb		"	232	sp., Str. & Wint	•••	"	282
robusta, Roxb		"	241	Daphne, Linn			198
robusta, Wall		"	235	acuminata, Boiss. & H		"	193
rostrala, Grah		"	237	Bholua, D. Don		"	193
rubiginosa, Rozb		"	232	buzifolia, Vahl	•••	"	193
rufa, Grah	•••		234	canescens, Wall		"	195
scandens, Roxb		"	240	cannabina, Wall		193	, 862
sissoides, Grah	•••	"	231	? cashemireana, Meissn		₹.	198
Sissoo, Roxb		"	231	coriacea, Royle	•		198
spinosa, Rozb	•••	"	238	eriocephala, Wall		"	197
stenocarps, Kurs	•••	"	238	Gardneri, Wall	•••	"	195
stipulacea, Rowb		"	237	hypericifolia (lapsu Sep		. 33	200
		233,		737-11	•		196
~ · · · · · · · · · · · · · · · · · · ·		•••	234		•••	"	195
Stocksil, Benth sympathetica, Nimmo	•••		234		•••	"	198
tamarindifolia, Rowb.	•••		284	1	•••	**	193
	•••	"	105	3/ 1	•••	"	194
tephrosioides, W. & A.	•••		286		•••	"	193
Thomsoni, Benth	•••	•••	240		••••	•••	193
timoriensis, DC	•••	•••	237	1 -123 0-22	•••	"	193
tingens, Wall	•••		237		•••	7	195
torta, Grah	•••		283	papyracea, Wall	•••	"	198
velutina, Benth	•••	•••	285	papyracea, wan	•••	"	193
volubilis, Rowb	•••	••	235	papyrifera, Ham	•••	"	195
seylanıca, Roxb	•••	**	60	papyrifera, Sieb	•••	"	
DALBERGIEE	•••		467	pendula, Sm	•••	"	194 195
Dalechampia, Linn	•••		467	sericea, D. Don	•••	"	195
bidentata, Thw	•••	••		virgata, Wall	•••	"	
coromandeliana, Heyne		"	467	viridiflora, Wall	•••	"	195
indica, Wight	•••	"	467	Wallichii, Meissn	•••	"	193
Kursii, Hk. f	•••		468	sp., Griff		"	193
scandens, Kurz	•••	•••	468	Daphnephyllopsis capit		22	77.477
ternata, Muell	•••	"	467	Kurs	···	ii.	747
velutina, Wight	•••	??	467	Daphnidium argenteu	-	_	107
Dalhousies, Grah	•••	ii.	248	Kurs	•••	▼.	187
bractesta, Grah	•••	??	248	bifarium, Meissn	•••	"	186
Dalibarda calycina, DC.	-:·		327	bifarium, Nees	•••	"	184
Dalrympelia pomifera, R			699	caudatum, Nees	•••	23	185
Dalzellia foliosa, Wight	••	. ▼.	63	? elongatum, Nees	•••	"	165
Lawii, Wight	•••	"	68	lancifolium, Thw	•••	"	187
pedunculosa, Wight ramosissima, Wight	•••	"	63	melastomaceum, Nees	•••	"	185
ramosiesima, Wight	•••	_7	68	ozyphyllum, Nees	•••	"	188
vivipara, Hassk	•••		888	pulcherrimum, Nees	•••	"	185
zeylanica, Wight			62	venosum, Meissn	•••	"	184
Damasonium indicum, Wi			662	Daphniphyllum, Bl	•••	▼.	358
Dammara alba, Rumph	•••		650	Benthami, Baill	•••	77	854
orientalis, Lamb	•••	▼.	650	glaucescens, Bl	•••	. 19	358
Rumphii, Pres	•••		650	himalayense, Muell.	• • • • • • • • • • • • • • • • • • • •	"	854
Damnacanthus, Gærtn.	•••	iiı.	15 8	Kingii, Hk. f	•••	"	854

Daphniphyllum	V ol.	. Page	Decaneuron	V ol.	Page
lancifolium, Hk. f	_	~~.	courtallense, Wight		227
laurinum, Baill	. ,,	353	dendigulense, DC		23 8
majus Muell		353	divergens, DO		234
Roxburghii, Baill		314	Epilejum, DC		227
Scortechinii, Hk. f		354	glabrum, DC		259
Dargeria linifolia, Done	• • • • • • • • • • • • • • • • • • • •	. 304	lilacinum, Dalz. & Gibs.		241
pinnatifida, Done		803	microcephalum, Dalz	"	229
Dasyaulus fulvus, Thw			molle, Dalz. & Gibs		228
microphyllus, Thw		545	molle, DC	• • •	227
Moonii, Thw		545	molle, Deless, lapsu Dio-	, "	
neriifolius, Thw		545	DOT COMPANY ALLOW		227
Dasyloma benghalense, DC	. ".		phyllolænum, DC		228
glaucum, DC		696	matigulatum DC	••	227
japonicum, Miq	• • • • • • • • • • • • • • • • • • • •	696	nankuidaan DO	"	227
	• • •	696	777	"	227
javanicum, Miq latifolium, Lindl		696	1 9	"	236
		696	hadhara DO	"	282
sub-bipinnatum, Miq		697		"	233
sp., Hk. f. & T.	"	051	Th	"	832
Dasystephana adscendens,	:-	117	1	1.	382
Borkh		656	Anilabasa 177/als	"	332
Datisca, Linn	ii.	2		."	469
cannabina, Linn	**	656	Decaspermum, Forst	11.	
nepalensis, D. Don	??	657 650	paniculatum, Kurz ii.	462,	
DATISCACE	11.	656	Deeringia, Br	i٧.	714
Datura, Linn	i▼.	242	Amherstiana, Wall	"	716
alba, Nees	"	248	baccata, Moq	**	714
dubia, G. Don	"	243	celosioides, Br	"	714
fastuosa, Linn	"	242	indica, Retz	77	714
feroz, Nees	"	242	Dehaasia, Bl	. ₹.	125
Hummatu, Bernh	"	242		125,	
Metel, Linn	**	243	elongata, Bl	▼.	126
Metel, Roxb	"	243	Kurzii, King	"	125
Nilhummatu, Dunal	**	243	microcarpa, Bl	"	126
Stramonium, Linn	١٠/	242	squarrosa, Zoll	29	126
Tatula, Willd	"	242	Delima, Linn	1.	31
Wallichii, Dunal	"	242	hebecarpa, DC	"	31
Dauous, Linn	ii.	718	intermedia, Bl	"	31
Carota, Linn	"	718	_ sarmentosa, Linn	"	31
Debregeasia, Gaud	٧.	590	DELIMEAL	i.	30
bicolor, Wedd	,,	591	Delphinium, Linn	i.	24
oeylanica, Hk . f	"	592	Ajacis, Linn	,,	27
dentata, Hk. f	,,	591	altissimum. Wall	"	. 26
bypoleuca, Wedd	99	591	Brunonianum, Royle	"	27 ·
leucophylla, Wedd	"	591	omruleum, Jacq	"	25
longifolia, Wedd	"	590	Carela, Ham	"	27
squamata, King	"	591	cashmirianum, Royle	"	26
velutina, Gaud	"	590	dasycaulon, Fres	"	2 5
Wallichiana, Wedd	"	591	denudatum, Wall	"	25
Wallichiana, Wedd	**	592	elatum, Linn	"	26
Decadontia carulescens, Griff.	iv.	602	elatum, $Linn$, glaciale, Hk , f . F T	"	.27
Decaisnes, Hk. f. & T	j.	107	Hoffmeisteri, Klotz	"	26
insignis, Hk. f. & T	"	107	incanum, Royle	"	2 5
	νi.	92	incisum, Wall	"	2 6
Decalepis, W. & A		11	Jacquemontianum, Camb.	i. 26	27
Hamiltonii, W. & A	"	īī	moschatum, Munro	i.	27
Decaneuron angustifolium,	••		pauciflorum, D. Don	29	27
Hk. f. & T	iii.	228	paucistorum, Royle	"	25
A		1	• • • • • • • • • • • • • • • • • • • •	••	-

Delphinium	Vol. Page	Dendrobium	Vol. Page
penicillatum, Boiss.	i. 24	Bulbophylli, Griff	v. 758
penicillatum, Hk. f. & T		Bullerianum, Batem.	, 743
pyramidale, Royle	, 26	calcaratum, Lindl	*** ***
ranunculifolium, Wall.		Calceolaria, Carey	,, 744
rectivenium, Royle	,, 26	Cambridgeanum, Paxt.	,, 748
saniculæfolium, Boiss.	,, 25	candidum, Wall capillipes, Rchb. f	, 735
scabriflorum, D. Don	,, 27	capillipes, Kchb. J	,, 751
uncinatum, Hk. f. & T.	,, 24	cariniferum, Rchb. f.	, 720
vestitum, Wall	,, 26	carnosum, Rehb. f	vi. 184
vestitum, Boiss	,, 24	Catheartii, Hk. f. v.	727, VI. 102
Visconum, Hk. J. & T.	,, 27	chlorops, Lindl.	v. 719
viscosum, Hk. f. & T. Dendrobium, Sw acerosum, Lindl. v. aciculare, Lindl	V. 710	chrysanthum, Wall.	,, 747
acerosum, Linal. V.	720, VI. 104	chryseum, Rolfe v.	740, VI. 107
aciculare, Linai	7. 720	chrysocrepis, Par. & R	2. f. v. 744
acinaciforme, acono.	,, 120	chrysotis, Rohb. f	,, 745
acrobaticum, Rehb. f.	, 751	chrysotoxum, Lindl.	710
Actinia, Lindl aduncum, Wall. v. aduncum, Hk. f	,, /10	ciliatum, Par	, 719
aduncum, Wall. v.	780, 71, 188	clavatum, Wall	, 746
aduncum, HR. I	VI. 100	clavatum, Roxb olavipes, Hk. f. v.	
aggregatum, Rozb.	v. 749	Clavipes, Hk. J. v.	728, vi. 184
aggregatum, Wall albidulum, Thw	, 749	Coologyne, Rchb. f	v. 712
aiotauium, inw	, 717	cœrulescens, Wall	, 740
albosanguineum, Lindl		compressum, Lindl	
album, Wight	"	concinnum, Miq	, 724
alosfolium, Rchb. f	*** //	conostalix, Rchb. f	, 726
alpestre, Royle	" 700	convexum, Lindl cornutum, Hk. f. v.	700 -1 105
amcenum, Wall	,, 738	cornucum, Ak. J. V.	700, VI. 100
amplum, Lindl	794	crassinode, Bens. & Roh	= 40
anceps, Sw Andersonii, Scott	" "	crepidatum, Lindl	
Andersonii, Scott	HOD	crepidatum, Griff	
angulatum, Wall	740	oretaceum, Lindl	740 -: 197
Aphrodite, Rchb. f	700	? criniferum, Lindl. v. crispum, Dalz	v. 716
aqueum, Lindl	704	orosetnm Hk f	v. 716
Arachnites, Rehb. f.	POA	crocatum, Hk. f	vi. 185
atropurpureum, Miq.	vi. 184, 198	crumanatum Sw	, 729,
attenuatum, Lindl	'	crumenatum, Sw	,, 729, vi. 184, 187
aurantiacum, Rchb. f.	M-1	orystallinum, Rchb. f.	v. 789
autannacum, recec. j.	" 751, vi. 187	cucullatum, Br	
aureum, Lindl		cumulatum, Lindl.	" 789 791 vi 185
bam busæfolium, Par. &	R.f, 727	cupreum, Herbert	v. 744
barbatulum, Lindl		cuspidatum, Lindl	
barbatulum, Batem.	710	cuspidatum, Lindl	70.4
barbatulum, Wight	710	cymbidioides, Lindl.	719
Bensonise, Rchb. f		Dalhousieanum, Wall.	
		Dalzellii, Hook	
bicameratum, Lindl. bicolor, Lindl	799	demissum, D. Don	, 783
bifarium, Lindl. v. 782	2. vi. 83, 186	densifiorum, Wall	
bifarium, Wall	71. 83	denudans, D. Don	, 715
binoculare. Rchb. f.	v. 747	denudans, Wall.	715
binoculare, Rchb. f. bolboflorum, Falc. v.	729, vi. 184	Devonianum, Part. v.	. 743, vi. 186
Boothii, Teysm. & Bi	nn. ▼. 728	Diodon, Rchb. f	v. 717
Boxallii, Rohb. f	, 748	Diodon, Rchb. f dixanthum, Rchb. f. v	. 746, vi. 187
		draconis, Rchb. f	v. 722
brevistorum, Lindl	, 729	eburneum, Rohb. f	722
braccatum, Lindl brevýtorum, Lindl Brymerianum, Rchb. f.	,, 745,	Egertonia, Lindl	,, 738
• • • • • • • • • • • • • • • • • • • •	vi. 187	eriseflorum, Griff	,, 715
			.,

Dendrobium	Vol.	Page	Dendrobium Vol. Page
eulophotum, Lindl	v.	Page 723	Kunstleri, Hk. f. v. 714, vi. 184 lamellatum, Lindl v. 749
7 - 31	,,	733	lamellatum, Lindl v. 749
extinctorium, Lindl	,,	788	1 198109108811M. Rchb. t 734
Falconeri, Hook	,,	742	Lawanum, Lindl ,, 740
	,,		Leonis, Rchb. f. v. 723, vi. 184
	,,	789	Lawanum, Lindl ,, 740 Leonis, Rchb. f. v. 723, vi. 184 leopardinum, Wall v. 758 lengaphloyum, Rahb f. 752
fimbriatum, Hook	,,,	745	1 1000000101 um, 1000. J , 102
	,,	789	Lindleyanum, Griff , 740
fimbriatum, Lindl	,,	714	Lindleyi, Steud ,, 750
Findleyanum, $Par. \& R$.		742	Lindleyi, Steud ,, 750 lituiflorum, Lindl ,, 740 Lobbii, Teysm. & Binn. v.728, vi. 184
Flabellum, Rohb. f		714	Lobbii, Teysm. & Binn. v.728, vi. 184
	▼i.	185	Loddigesii, Rolfe vi. 187 lonchophyllum, Hk. f. v. 714, vi. 184
	▼.	720	lonchophyllum, Hk. f. v. 714, vi. 184
flewuosum, Wall	,,	729	longicolle, Lindl. v. 712, vi. 183 longicornu, Lindl v. 720 longipes, Hk. f. v. 713, vi. 183
floribundum, D. Don	··· ".	751	longicornu, Lindl v. 720
formosum, Roxb. v. 7	721, vi.	187	longipes, Hk. f. v. 713, vi. 183
fugax, Rchb. f	▼.		Lubbersianum, Rchb. f v. 722
fuscatum, Lindl fuscescens, Griff	,,,	746	luteolum, Batem " 733
Inscescens, Griff	,,	712	Macarthise, Thw ,, 736
Fytcheanum, Batem	,,	719	Macraei, Lindl. v. 714, vi. 184 macrepodum, Hk. f. v. 713, vi. 183
gemellum, Lindl	,,	727	macropodum, Hk. f. v. 713, wi. 183
geminatum, Lindl. v. 7	13, 7.	. 100	macrostachyum, Lindl v. 785
Gibsonii, Lindl	໌▼.	740	marginatum, Batem , 733
graminifolium, Wight grande, Hk. f v. 7		710	marginatum, Batem ,, 733 marmoratum, Rchb. f ,, 738 megaceras, Hk. f. v. 731, vi. 185
grande, Hk. J V. 7	24, VI	. 104 755	megaceras, Hk. J. V. 731, VI. 185
grandiflorum, Reinw.	v.	700	melanophthalmum, Rohb. f. v. 741
gratiosissimum, Rchb. f	,,	743 749	mesochlorum, Lindl ,, 738
Griffithianum, Lindl	*** **	749	metachilinum, Rchb. f , 733
Guibertii, Carr hæmoglossum, Thw	,,	727	micranthum, Griff ,, 723 microbulbon, A. Rich , 716
Hanburyanum, Rehb. f.			TOO. 1
Harveyanum, Rchb. f.		P7 AP7	microcnitos, Daiz ,, 789
		FOE	miserum, Rchb. f ,, 717 moschatum, Wall. v. 744, vi. 185
Henshalli, Rohb. f	"	-	moulmeinense, Par. v. 746, vi. 187
		710	multiflorum, Par. & Rehb.f. v. 724
hercoglossum, Rchb. f. v.	730 v	185	manage of Time! 790
heterocarpum, Wall	▼.	787	76
Heyneanum, Lindl.		718	717
hirsutum (iriti		720	Nothenielia Dakh f 794
Hookerianum, Lindl. Hughii, Rchb. f. v. 7 humile, Wight hymenanthum, Hk. f. v.	,,	745	nobile, Lindl ,, 740
Hughii, Rchb. f. v. 7	52, v i	187	nodatum, Lindl ,, 743
humile, Wight	΄▼.	716	nodosum, Dalz ,, 714
hymenanthum, Hk. f. v.	73 2 , vi	. 185	normale, Falc ,, 748
hymenopterum, Hk. f.	Vl.	185	nutans, Lindl " 734
inauditum, Rohb. f	,,	183	ochreatum, Lindl , 747
incurvum, Lindl	V.	718	pachyglossum, Par.& Rchb.f., 727
Infundibulum, Lindl	,,	721	palpebræ. <i>Lindl.</i> 750
Infundibulum, Rchb. f	,,	721	panduratum, Lindl ,, 717
Infundibulum, Rohb. f. ionopus, Rehb. f. v. 7	32, vi.	186	panduriferum, Hk. f vi. 186
Jamesianum, Rchb. f	▼.	721	parciflorum, Rchb. f v. 725
Jenkinsii, T. Anders	,,	731	parcum, Rchb. f ,, 720
Jenkinsii, Wall	,,	750	pardalinum, Rohb. f ,, 714
Jerdonianum, Wight .		734	Parishii, Rchh. f , 740
junceum, Lindl	··· ».	726	parviflorum, D. Don ,, 752
kentrochilum, Hk. f. v.	/31, vi	. 185	Paxtoni, Lindl ,, 747
kentrophyllum, Hk . f . v .			Paxtoni, Paxt , 745
Kuhlii, Lindl	▼.	73L	peguanum, Lindl " 717

Dendrobium	Vol Dome	Dendrobium v	ol. Page
nendulum Roch	Vol. Page 741 vi 186		v. 748
pendulum, Roxb. v. perakense, Hk. f. v. Perula, Rchb. f. v.	712. vi. 183	4 - 421 - 7 2 31	MAA
Pernla Robb f v.	732, vi. 186	transparens, Wall	738
pictum, Griff	v. 743		,, 751
		I Andread a Laid and Donale	, 765
Pierardi, Roxb podagraria, Hk. f. v.	728. vi. 184	durindana Wall	790
polyanthum, Lindl	v. 751		i. 186
	, 741	tuberiferum, Hk. f. v. 723, v	
polyphlebium, Rchb. f.			. 732
polystachys, Thou	vi. 21	vaginatum, Wall	ri. 88
porphyrochilum, Lindl		1	, 191
præcinctum, Rchb, f.	752	vestitum. Wall	v. 806
præcinctum, Rchb. f. primulinum, Lindl	735	vexabile, Rchb. f	v. 752
? pubescens, Hook	, 801	villosulum. Wall	, 729
pulchellum, Roxb		-in-decomp Dalik f	,, 722
pulchellum, Lindl		Wardianum, Warn. v. 742, v	
pumilum, Roxb v.	713, vi. 184	Wardianum, Warn v	
pumilum, Par. & Rehl	. f. v. 714	Wattii, Rchb. f	, 721
purpurascens, Thw		Williamsoni Day Pall f	, 721
P pusillum, D. Don			, 733
pycnostachyum, Lindl.		xantholeucum, Rohb. f	, 752
pygmæum, Lindl	, 717	sp., Griff. v. 718, 737, 738, 74	1 4, 745
quadrangulare, Par. v.	714, vi. 184	Dendrocalamus, Nees v	
Rabani, Lindl	v. 714	Balcooa, Voigt	, 391
ramosissimum, Wight	, 720	Brandisii, Kurz	, 407
ramosum, Lindl	" 736	Brandisii, Kurz calostachyus, Kurz	, 407
revolutum, Linil		Collettianus, Gamble	, 408
rhodocentrum, Rchb. f.	, 731	criticus, Kurz	,, 389
rhodopterygium, Rchb	f. "741		, 408
rhombeum, Lindl	,, 737		, 406
rotundatum, Benth	,, 712		, 394
Ruckeri, Lindl	, 733	Hamiltonii, Nees & Arn ,	, 405
sanguinolentum, Lindl.		Hookeri, Munro , latiflorus, Munro	, 405
scabrilingue, Lindl.		latinorus, Munro	, 407
Scortechini, Hk. f	, 741	1	, 408
secundum, Wall	, 730'		, 407 . 404
senile, Par. & Rehb f.	, 751	7.7 7 (0)	400
seriatum, Wall	, 796	Donichii Managa	403
Serra, Lindl	,, 722	matallania Camble	406
sinuatum, Lindl	,, 724	Munus	404
Spatella, Rchb. f	797	1	AOE
spathaceum, Lindl.	" "		404
sphegidiglossum, $Rchb$	vi. 186	Tailde Weimb	997
administration Clariff	- 75E	Dendrochilum, Bl	
striatum, Griff strongylanthum, Rchb	v. 705	hmotocenm Dokk f	709
stuposum, Lindl. V.	737, vi. 186	fuscum, Teysm. & Binn v	
evanicaimum Rohh f.	v. 750	linearifolium, Hk. f. v. 782, v	
suavissimum, Rohb. f.	vi. 184	pallidiflavens (pallidi-	
euhulatum. He f.	726, vi. 184		. 7 82
subulatum, Hk. f. v. subulatum, Lindl	vi. 184	roseum, Dalz	
sulcatum, Lindl	v. 749	Dendrocnide crenulata, Miq.	550
tenuicaule, $Hk. f.$	vi. 184	Dendrocolla amplezicaulis, Bl. vi	i. 40
teres Lindl	v. 726	Arachnites, Bl ,,	
teres, Roxb	vi. 49	Hystrix, Bl	. 39
terminale. Par. & Rchl	o. f. v. 725	pulchella. Thw	39
Teysmanni, Miq	vi. 184	serræformis, Lindl	41

- ' "	-	*-1 T	20 mg	Derris		Vol. I	age
Dendrocolla	`	ol. F	34	vestita, Baker			242
		٧ ٧.	786	Wightii, Baker		"	247
Dendrolirion, Lindl	•••	٧.	,00	Deschampsia, Beauv.		vii.	278
Dendrolobium Cephalotes		ii.	162	aralensis, Regel		1)	359
Benth	•••		161	Biebersteiniana, Sol		"	273
umbellatum, Benth	•••	"	101	brevifolia, Br		"	273
Dendropanax, Dene. &		*:	733	cespitosa, Beauv.		"	273
Planch	•••		733	kœlerioides, Regel		**	273
japonicum, Seem	•••	"	733	sp., Wall	vii.	2 73,	344
parviflorum, Benth.	•••	"	783	Desmanthus, Willd.		ii.	290
proteum, Benth	n	"	206	Adenanthera, Wall.		"	286
Dendrophthoe coccinea, G.		▼.	216	cinereus, Willd.	•••	"	288
farinosa, Miq	•••	"	210	lacustris, DC		"	285
furruginea, G. Don	•••	"	210	leptophyllus, DC.	•••	"	290
fusca, Miq	•••	,,	208	natan, Willd		"	285
macrocalyw, Miq	•••	"	209	plenus, DC		"	286
obovata, Miq	•••	"	210	polyphyllus, DC.	144 ***	"	286
Oortiana, Miq	•••	,,		punctatus, DC	•••		-286
pentandra, Miq	•••	"	216 206	stolonifer, DC		"	285
pentapetala, G. Don	•••	"		strictus, DC		"	290
pulcher, Miq		"	205	triquetrus, Willd.	***		286
Dendrotrophe buxifolia, I	aig.	٧.	234	-incetna Willd		"	290
varians, Miq	•••	?"	233	virgatus, Willd.			328
Dentaria dasyloba, Turcz.	•••	i.	139	Desmazeria unioloide Desmocarpus missioni	Wall	i.	172
Dentella, Forst	•••	iii.	42	Desmocurpus ditessión	lia DC	i₹.	718
erecta, Roth	•••	"	428	Desmochæta alternifo			723
repens, Forst	•••	??	42	atropurpurea, DC.		"	718
Derris, Lour	•••	ii.	240	ciliata, R. & S			724
acuminata, Benth	•••	"	247	flavescens, DC	•••		723
affinis, Benth	•••	"	242	micrantha, DC	•••		718
amcena, Benth	•••	"	245	muricata, Wight	•••		724
brevipes, Baker	•••	"	244	orbiculata, Wall.	•••		724
canarensis, Baker	•••	99	246	patula, R. & S	•••		723
cuneifolia, Benth	, •••	"	243	patula, ? Wall			723
dalbergioides. Baker	•••	,,	241	prostrata, DC	•••	•	723
discolor, Benth	•••	"	212	prostrata, Wight			723
elegans, Benth	•••	,,	242	repens, R. & S	•••	•••	722
elliptica, Benth		"	243	tomentosa, R. & S.		••	724
oualata, Bedd	•••	"	244	_ velutina, Wall			161
ferruginea, Benth		,,	245	Desmodium, Desv.			166
Heyneana, Benth	•••	,,	244	abyssinicum, DC.	•••	• •	163
Maingayana, Baker	•••	27	245	alatum, DC	•••		170
marginata, Benth	•••	22	245	amænum, Wall	•••		167
microptera, Benth		"	243	angulatum, DC.		. ,"	
oblonga, Benth	•••	,,	242	angulatum, Wall.	ii. 144		, 172 164
ovalifolia, Benth	ii.	243	, 247	Aparines, Hassk.	•••		168
paniculata, Benth	•••	ii.	242	argenteum, Wall.	•••	. ,,	172
parviflora, Benth	•••	11	240	auricomum, Grah.		. ,,	
pinnata, Lour		99	234	auriculatum, DC.	••• ••	. ,,	163
platyptera, Baker		19	24 5	australe, Hassk.			162
polystachya, Benth			247	bambusetorum, Mic		. ,,	165
robusta, Benth		•••	241	barbatum, Wall.	•••	. ,,	167
scandens, Benth		• • •	240			. ,,	163
secunds. Baker		• • •	247	bicol r, Wall		. ,,	164
sinuata, Thw		• • • • • • • • • • • • • • • • • • • •	246	brachystachyum,		. ,,	171
thyrsiflora, Benth			246	Buergers, Miq		. ,,	171
trifoliata, Lour			242	cæspitosum, DC.	•••	. ,,	173
uliginosa, Benth		"	241	caffrum, E.& Z.	•••	,,	166
anguan, pours.	•••	•••					

Dagmadium	 .1	D	1 Dogmodium		w-1	D
Desmodium		Page	Desmodium		A OIT	Page 171
cajanifolium, DC	ii.	161 170	patens, Wight paucinervium, DC	•••		170
capitatum, DC	••• ,,	163	penduliflorum, Wall.	•••	11	170
cateniferum, Arn Cephalotes, Wall	,,	161		•••	,,	170
77 · • • • • • • • • • • • • • • • • • •	,,	168		•••	,,	165
collinum, Wall	,,	170	podocarpum, Miq		"	165
concinnum, DC	,,	167	T . 1		"	171
confertum, DC	,,	152		•••	"	170
congestum, Benth	,,	162	polycarpum, W. & A. polycarpum, Wall	•••	**	167
	,,	156	polycarpum, Wall præmorsum, Grah	ii.	154	, 174
dasyphyllum, Miq	••• "	169	' דיייייענ		ji.	169
dichotomum, DC	*** ***	169	Pseudo-gyroides, Miq.	•••	-	175
diffusum, DC	,,	164	Pseudo-triquetrum, DC	•••	"	163
diffusum, DC	*** ,,	172	pulchellum, Benth		"	162
distans, Royle	••• ,,	165	punctatum, DC	•••	"	226
dolabriforme, Benth.	,,	167	quinquangulare, Wigh	•••	,,	169
dubium, Lindl	,,	164			9.9	164
elongatum, Wall	,,	171		•••	"	173
ferrugineum, Wall	*** ;;	168		•••	,,	166
flexuosum, Wall	,,	167		•••	**	170
floribundum, G. Don	,,	168		•••	"	171
gangeticum, DC	,,	165	retusum, G. Don	•••	"	174
Gardneri, Benth	,,	162	Rottleri, Baker	•••	**	164
grande, Kurz	,,		Rottleri, G. Don	•••	"	172
Griffithianum, Benth.	*** ***	171	rotundifolium, Baker	•••	,,	170
gyrans, DC	***))	174	rotundifolium, Wall.	• • •	"	169
gyroides, DC	,,	175	Rozburghii, Wall	•••	"	175
gyroides, Hassk	;;	171	Roylei, W. & A	•••	4))	171
heterocarpum, DC	••• ,,	171 173	rufescens, DC sambuense, DC	•••	"	107
heterophyllum, DC.	•••))	173	l 01 n/a	•••	**	165
heterophyllum, Wall.	,,	156	0.71	•••	"	166
Horsfieldii, Miq	,,	165		•••	"	174
japonicum, Miq	,,	172	scoparium, Wall	•••	"	170
jucundum, Thw	,,	163	1	•••	"	162
laburnifolium, DC	,,	169	I vir 11	•••	"	172
lasiocarpum, DC	,,	168		•••	**	167
latifolium, DC	,,	168	serriferum, Wall siliquosum, DC	••.	"	171
latifolium, Wight	••• **	164	1 -1	•••	99	166
laxiflorum, DC	,,	165		•••	"	164
lanum, DC	 ii. 161,		stipulaceum, Hassk.	•••	"	174
leptostachyum, Wall. Lescheraultii, DC	•• •	154	strangulatum, W. & A.	•••	"	165
12 A O		162	2 7 337 79		"	164
lineatum, Span	••• ,,	168	4 0 1	•••	"	172
	,,	174	A 117-11	•••	**	164
	,,	167	Thwaitesii, Baker	•••	**	169
	••• ,,	171	tiliæfolium, G. Don	•••	"	168
	••• ,,	168	And all a small and TOO		**	172
	••• ,,	166	trichocaulon, Hassk.	••	**	165
	,,	166	4 TO C	•••	17	178
oblatum, Baker	,,	166	4 10 507 11	•••	"	178
oblongum, Wall	,,	170		•••	"	165
	••• ,,	170	trinerve, Grah triquetrum, DC	•••	"	168
	••• ,,	164		•••	"	161
	,,		Dan 41	•••	"	162
	••• ກ	171 167	77 111	•••	"	169
	•••• >>			•••	••	154
	,,	172	viscidum, DC	•••	99	163
parvifolium, DC	27	174	viticinum, Wall	•••	29.	100

Desmodium	Vol.	Page	Dianthera	Vol. 1	Page
Walkers, Arn	ii.	169	tomentosa, Roxb. •	iv.	395
Wightii, Grah	"	169	virgata, Benth	"	542
Willdenovii, G. Don	"	169	Dianthus, Linn	i.	218
zonatum, Miq	"	164	anatolicus, Boiss	"	214
Desmostemon zeylanicus, Thw.		400	angulatus, Royle	"	215
Desmotrichum fimbriatum, Bl.		714	barbatus, Linn	33	215
geminatum, Bl		183	cachemirious, Edgew	"	214
Detarium seylanicum, Thw.	ii.	271	Caryophyllus, Linn	"	214
Deutzia, Thunb	ii.	406	caucasicus, Sims	"	215
Brunoniana, Wall	,,	407	chinensis, Linn	"	213
corymbosa. Br	"	406	orinitus, Sm	"	215
corymbosa, Lindl	"	407	deltoides, Linn	"	214
macrantha, Hk. f. & T	"	407	Falconeri, Edgew	"	214
? parviflora, Bunge	"	406	fimbriatus, Biebr	"	215
stamines, Br	"	407	glaucus, Ham	"	213
Deyeuxia, Clar		265	incertus, Jaoq	"	215
abnormis, Hk. f	"	268	Jacquemontii, Edgew	"	214
compacta, Munro	"	267	Liboschitzianus, Ser	"	214
elatior, Hk. f		266	Seguieri, Vill	"	215
filiformis, Hk. f	"	268	Diapensia, Linn	iii.	
Griffithii, Munro		263	himalaica, Hk . f . & T		478
japonica, Spreng	"	146	DIAPENSIACE	iii.	478
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	"	267	Diaphora cochinchinensis,		
pulchella, Hk. f	"	268	Lour	vi.	690
* . 1 12	33	267	Diarthron, Turcs	٧.	196
1 72° 13	"	266	carinatum, J. & S		196
ee	"	269	vesiculosum, Fisch. & Mey.	"	196
777 6	"	266	Diastemanthe platystachys,	"	100
sp., Hk. f. & T. vii. 266,	267		04. 3	vii.	91
Diacicarpium rotundifolium,	201	200	751. 1	ii.	630
TT I-	ii.	743			630
Hassk		743		.".	574
tomentosum, Bl	ii.	269	701		574
Dialium, Linn		269		"	333
indum, Linn	••	269		i.	383
laurinum, Baker	"	269	2-2-1-12-12- Tr41	"	333
Maingayi, Baker	"	269		?	120
ovoideum, Thw	"	270	Dicentra, Borkh Roylei, Hk. f. & T	1.	121
patens, Baker platysepalum, Baker		270	scandens, Walp	"	121
		336		"	121
Dianella, Lamk	₹ì.	337	thalictrifolia, Hk. f. & T.	"	121
ensifolia, Redouté	"	337	torulosa, Hk. f. & T	<u>."</u>	163
javanica, Kunth	"	337	Dicerma biarticulatum, DC.	ii.	162
nemorosa, Lamk		3 8 7	pulchellum, DC repens, Grah	**	
odorata, Bl		337	repens, Gran	"	178
sandvicensis, Hook. & Arn.	•		VESULUMIN, WESTI	,"	162
DIANTHER	•	212	Diceros angustifolius, Wall	1 V .	275
Dianthera, Linn		541	longifolius, Pers	"	275
bicalyculata, Retz	"	554	Dicerostylis lanceolata, Bl	V 1.	110
collina, Clarke		543	Dichæspermum aurantiacum,		o#o
debilis, Clarke	"	542	Hassk	¥1.	878
dichotoma, Clarke	"	543	Blumei, Hasak	"	880
Griffithii, Benth	•••	542	giganteum, Hasak	"	376
Pindica, Clarke	"	548	juncoides Wight Kænigii, Hassk	"	381
japonica, Thunb		556	Kænigii, Hassk	29 .	881
leptostachya, Benth		542	lanceolatum, Wight	13	381
malabarica, Linn. f		554	ochraceum, Hassk	"	880
paniculata, Lour	"	541	paniculatum, Hk. f. & T.	"	381

Dichaspermum	Vol.	Page	Dioliptera	Vol.	Page
repens, Clarke	-:	380	Additional to the same	. iv.	
repens, Hassk		378	1 1 1 1 1 NT	. ,,	552
repens, Wight		380	bupleuroides, Nees		554
semiteres, Hassk		381	Diament of Andrea	. ,,	558
	vii.	300	1 1)	. ,,	553
Wightii, Nees		300	anndiannum Mann	•• ,,	554
	vii.		l	•• ,,	550
TTakan		196	aminista Nona		554
Dichelactina (Dichelastina)				••	552
	_	289	1 1.:		554
The same of the sa	•••	128			551
		128	1 7 51	-	553
zeylanica, Thw Dichodon (lapsu Diplodon)	**	120	1 1 11 37	. ,,	553
		907	micranthes, Nees		
cerastioides, Rohb		227	parvibracteata, Nees		551
Dichopsis, Thw		540	repens, R. & S	. ,,	549
? caloneura, Hk. f		546		. ,,	552
canaliculata, Benth	***	541	riparia, Nees	. ,,	553
elliptics, Benth	"	542	Roxburghiana, Necs	. ,,	553
grandis, Benth	79	540		. ,,	554
Gutta, Benth	• • • • • • • • • • • • • • • • • • • •	543		,,	554
Helferi, Clarke	39	542		,,	554
hexandra, Clarke	"	543	specioss, Kurz	. ,,	552
lmvifolia, Benth	11	541	zeylanica, Nees	,,	552
lanceolata, Benth	71	541	sp., Hk. f. & T	,,	547
Maingayi, Clarks	"	543	Dicoma, Cass	. iii.	. 387
obovata, Clarke		542	lanuginosa, DC	,,,	387
pauciflora, Benth		541	1 A	,,	387
petiolaris, Thw		540	Dicræa alyæformis, Bedd	▼.	65
_ , , , , , ,	. 11	542	apicata, Tul	,,	68
rubens, Clarke		543	dichotoma, Tul		64
rubiginosa, Benth	•••	541	[1	. ,,	65
Dichostylis Micheliana, Nees	vi.	662	1 16-11 m 1071 mln 4	"	64
pygmæa, Nees		596		. ,,	67
Dichotomanthes, Kurz	22	581		. ,,	67
Dichros, Lour	••	406	1 0 1	,,	64
cyanitis, Miq		406	selaginoides, Wedd		68
		406	stylosa, Wight		65
		406	Wallichis, Tul		, 67
.	iii.	245	l	•••	64
The 13 " 17 AT 1 1		246	Dicranacanthus buxifolius,	. ,,	0.
		245		-	483
chrysanthemifolia, DC	-	245			484
gracilis, DC		245	Spina-ceylanica, Oerst Dicranostigma lactucoides,	,,	101
grangeæfolia, DC	"	246			119
Hamiltoni, Hk. f	**	245	Hk. f. & T		
latifolia, DC	**		Diotamnus, Linn		487
nilagirensis, Soh. Bip	22	245	albus, Linn		
oblongata, Benth		245	Frazinella, Pers		487
Schmidtii, Wight	99	817	himalayensis, Royle		487
sonchifolia, DC	19	245	Dictyocarpus truncatus, Wigh		322
tanacetoides, Soh. Bip	. ??	245	l Dictyodaphne Candolleana		
Dichrostachys, $DC. \dots \dots$	ii.	288	Meissn		125
oineres, W. & A	99	283	Dictyospermum conspicuum		
Dichrotrichum Griffithii,			Hassk	. Vi.	382
Clarke	iv.	844		. ,,	882
Diclidium ferox. Schrad	. vi.	624	ovalifolium, Wight	. ,,	882
Dicliptera, Juss	. iv.	550	ovatum, Hassk	. ,,	382
Beddomei, Clarke		551	protensum, Wight	. ,,	382

				. 70:1	
Dictyospermum		Vol. 1		Didymocarpus Vol. P	age
Wightii, Hassk		368,	382		352
Didactylon ramosum, Zoll.					358
Mor		vii.	104	Rottleriana, Wight ,, 3	358
simplex, Zoll. & Mor.	•••	**	104	rufipes, Clarke ,, &	351
Didissandra, Clarke	•••		355)	352
			355		347
	•••	"	855	l autaliana ana Olamba	348
lanuginosa, Clarke	•••	"			
rufa, King	•••	_ "_	355	,	353
Didymocarpoid, Griff	ì₹.	349,		, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	347
Didymocarpus, Wall	•••	iv.	345		347
acuminata, Br	•••	"	349	villosa, Clarke ,, &	348
Andersoni, Clarke		"	346	zeylanica, $Br.$,,	354
aromatica, Wall	•••		347	sp., Griff ,, 5	358
		"	348	sp., Hk. f. & T. iv. 346, 348, 349, 3	357
	•••	11	346.		884
aromatica, Wall	•••	**			
aurantiaca, Clarke	•••	77	346		884
barbinerva, Clarke	•••	"	350		598
einerea, D. Don	•••	"	346		576
corchorifolia, Wall.	•••	"	351	Didymoplexis, Griff vi. 1	l21
cordata, Wall		"	850	pallens, Griff ,, 1	l 22
crinita, Jack	•••		351	Didymosperma, H. Wdl. & Dr. vi. 4	120
1 4 4 70 1		"	860	1	120
A <i>m</i>	•••	"	354	, , , , , , , , , , , , , , , , , , ,	120
floccoss, Thw	•••	92		Hackeniana David	120
Griffithii, Wight	•••	**	844		
hamosa, Wall		"	360	,, , ,,	120
Hookeri, Clarke	•••	,,	349		167
Humboldtiana, Gardn.	•••	**	8 53	Dielytra scandens, D. Don i.]	L21
incana, Benth	•••	"	852	Dienia congesta, Lindl v. 6	690
Kurzii, Clarke	•••	"	358		688
lanuginosa, Wall	•••		355	1 A Tanah " 4	690
leucocalyx, Clarke		"	848	7	689
longepetiolata, Gardn.	•••	"	354	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	•••	"	=	1 45.1 7 27 1 1	
longipes, Clarke	•••	"	85L	Digera, Forsk iv.	
lyrata, Wight	•••	33 .	353	,,,	718
macrophylia, Wall.	•••	"	845		717
macrophylla, Wall	•••	"	84 5		718
marginata, Clarke	•••	,,	852	ciliata, Moq "	718
membranacea, Bodd.		"	854	Forskalii, Bl "	718
missionis, Wall	•••		854	muricata, Mart ,,	718
mollis, Wall	•••	"	850	DIGITALEE iv. 248, 2	
Mana at Mana		"	348		
7470 707 11	•••	"	365	Digitalis stricta, BOXD IV. &	18
- l. 1 TIT-17	•••	**		Digitaria zgyptiaca, Willd. vii.	30
oblonga, Wall	•••	99	846	affinis, R. & S ,,	
obtusa, Wall	•••	"	346	australis, Willd ,, barbata, Willd ,,	14
ovalifolia, Wight	•••	"	854	barbata, Willd ,,	16
paucinerva, Clarke	•••	"	850	biformis, Willd ,,	18
pedicellata, Br		"	345	ciliaris, Pers ,,	14
platycalyz, Clarke		"	849	ciliaris, ? Wight "	15
platypus, Clarke			352	annumetrie Coheli	14
plicata, D. Don		,,	346	announted San & Wina	15
	•••	>>	347	commonite Wille	67
podocarpa, Clarke	•••	"		anniugata Dahmit	
primulafolia, Gardn.	:	."-	354	conjugata, Schult ,,	12
primulifolia, D. Don		347,		cruciata, Nees ,,	14
pulchra. Clarke	•••	i▼.	848	P cuspidata, Schult "	82
punduana, Wall	•••	"	349		289
pygmæs, Glarke,	•••	,,	845	debilis, Willd ,,	16
repens, Bedd	•••	"	854	didactyla, Willd ,,	14
		•••		· · · · · · · · · · · · · · · · · · ·	

Digitaria		Vol.	Page	Dillenia	Vol.	Page
distachya, Bojer	•••	vii.	14	parviflors, Griff	. i.	38
distachya, Pers	•••	"	37	pentagyna, Rozb	. ,,	. 38
elongata, Spreng	•••	"	290	pilosa, Ham		38
elytroblephara, Miq.		,,	16	pilosa, Roxb	. "	38
eriantha, Steud	•••	"	14	pulcherrima, Kurs		37
eriogona, Link		"	14	repanda, Roxb		37
filiformis, Koel	•••	"	17	retuss, Thunb		37
glabra, Beauv		,,	17	scabrella, Roxb	•	38
hispidula, Willd		"	31	speciosa, Griff	•	37
horizontalis, Willd	•••	"	14	speciosa, Thunb	•••	86
humifusa, Pers		"	17	DILLENIACEÆ	· ;;	30
linearis, Pers	•••	"	14	DILLENIEE	•	31
linearis, Rostaf			17	Dillwynia trifoliata, Roth	••	63
Zám amuria. Olahanta		27	18	Dilochia Wallichii, Lindl		858
7.544 25 Cl 12 1.	•••	"	289	Thill add an air Title A		786
	•••	"	18	D21		160
longiflora, Pers	•••	>>	14	ania mana		161
marginata, Link	•••	"	289			103
maritima, Spreng	•••	"		Dimeria, Br		
mauritiana, Wall	•••	"	35	alata, Hk. f	•••	105
nervosa, R. & S	•••	"	14	connivens, Hack	, ,,	104
nodosa, Webb & Berth.	•••	"	14	P diandra, Griff	19	104
procumbens, Hort	•••	,,	17	filiformis, Hochst	. ,,	104
pruriens, Büse	•••	"	14	fuscescens, Trin	, ,,	105
Pseudo-Duroa, Miq.	•••	,,	18	gracilis, Nees	* **	105
puberula, Link	•••	"	19	Hohenackeri, Hochst	**	103
radiata, Spreng	•••	"	289	Kurzii, Hk. f	. ,,	103
radicosa, Miq	•••	,,	14	laviuscula, Thw	٠,,	105
repens, Willd	•••	,,	14	Lehmanni, Hack	***	104
Rottleri, R. & S	•••	,,	14	leptorhachis, Hack	,,,	105
Roxburghii, Spreng.	•••))	18	ornithopoda, Tris		104
sanguinalis, Scop	•••	,,	14	ornithopoda, Thw	"	105
sanguinea, Boop		,,	14	pilosissima, Thw		106
san juinolenta, Edgew.	•••	"	14	psilobasis, F. Muell		104
setigera, Roth	•••	:,	14	pubescens, Hack		105
stolonifera, Schrad.	•••		289	pusilla, Thw		103
adadada Dash		"	59	pusilla, Thw	••	103
tenuiflora, Beauv	•••	"	18	stipæformis, Miq	•	104
bar a man t	•••	vii.	221	tenera, Trin	••	104
	•••		221	9 ///L	•••	103
	•••	"	221	777 3	, 11	104
arundinacea, Trin	•••		481	sp., Wall vii.	10,1	105
	•••	iv.				687
ilicifolia, Nees	•••	,,	481	Dimocarpus crinita, Louf		
scanden , Nees	•••	"	481	Lichi, Lour i.		
volubilis, Nees	•••	,,,	481	Longan, Lour	i.	689
Dillenia, Linn	•••	i.	36	pupilla, Moon	* **	689
augusta, Roxb	•••	"	38	undulatus, Wight	- 22	689
aures, $Sm. \dots \dots$	•••	33	37	verticillata, Roxb	19	684
bracteata, Wight	••	,,	37	· _ sp., Wall	17	555
dentata, Thunb	•••	,,	36	Dimorphocalyx, Thw	₩.	403
elliptica, Thunb	•••	"	36	andamanicus, Benth	"	403
floribunda, Hk. f. & T.	•••	"	33	capillipes, $Hk. f.$	11	404
grandifolis, Wall	•••	"	38	glabellus, Thw		403
indica, Lina	•••	"	36	glabellus, Bedd		404
integra, Thunb	•••	"	37	Kunstleri, King		405
meliosmæfolia, Hk. f. &		"	36	Lawianus, Hk. f		404
			. 37	malayanus, Hk. f		404
ovata, Wall,		"	36	Dinebra, Jacq	vii.	296

Dinebra		Vol.	Page	Dioscorea Vol. Pag	70
æjyptiaca, Del		vii.	297	glabra, Wall vi. 292, 293, 29	4
arabica, Jacq	•••	,,	297	globosa, Rozb vi. 29	В
retroflexa, Panz		"	297	Hamiltoni, Hk. f ,, 29	б
verticillata, Wight	vii.	297.	327	heterophylla, Roxb ,, 29	5
sp, Wall		vii.	297	hirsuta, Dennst ,, 28	9
Dinetus paniculatus,	•••	• • • •	,	Hurchusia, Ham ,, 29	-
Sweet		iv.	222	in anguarta Ham	
			222	intermedia Man 90	_
The 11 The	•••	.;;	414	Tanamamati III. 6 90	-
	•••		415	inneries Uh Made	_
andamanica, Kurz	•••	"	415	Viciniana Vanaba 99	-
M'Clellandi, Kurz	•••	"	414	lumananata Vanth 90	
Tjankorreh, Büse	•••	":		74 TD-18	
Dioclea, H. B. K	•••	ii.	196	,,	_
Fergusonii, Thw	•••	"	196		
javanica, Benth	•••	"	196	laurifolia, Wall ,, 29	=
lasiocorpa, Mart	•••	"	196	lunata, Roth, 28	-
reflexs, Hk. f	•••	,"	196	nepalensis, Sweet ,, 29	-
Dioclea, Spreng	•••	iv.		nummularia, Kunth , 29	_
hispidissima, Spreng.	•••	;,	176	nummularia, Lamk ,, 29	
Diacia pentandra, Wall.	•••	i.	586	? nummularia, Willd ,, 29	_
Dioscorea, Linn	•••	٧i.	288	obcuneata, $Hk. f. \dots , 29$	
aculeata, Linn	•••	1)	296	octangularis, Ham ,, 29	_
aculeata, Ham	•••	"	291	odoratissima, Wall ,, 29	
aculeata, oxb	•••	"	291	oppositifolia, Linn ,, 29	
aculeata, Wight	•••	**	2 95	orbiculata, <i>Hook</i> ,, 29	
acutangula, Ham	•••	"	296	ovata, Ham ,, 29	5
alata, Linn	•••	"	296	peltata, Juss ,, 29	7
alata, Griseb	•••	,,	295	pentaphylla, Linn ,, 28	9
altissima, Roxb	•••	"	289	pentaphylla, Wall ,, 29	0
amæna, Roxb		,,	289	polyclades, Hk. f ,, 29	4
angulata, Roxb	•••	"	296	pulchella, Roxb ,, 29	5
anguliflora, Stead		"	2 96	purpures, Roxb ,, 29	7
anguina, Rozb	•••	"	293	pyrifolis, Kunth ,, 29	2
atropurpures, Rozb.		99	296	rubella, Rozb " 29	7
Bisantaca, Ham	•••	11	29ส	sagittata, Royle ,, 29	4
bulbifers, Linn	• • • •	"	296	sativa, Linn ,, 29	5
bulbifera, Br			295	sativa, Hb. Madr ,, 29	5
bulbifera, Russ		**	2 96	sativa, Linn i. 597, vi. 29	1
Cerubulium, Ham		"	291	sativa, Wall vi. 292, 29	5
Cliffortiana, Lam		"	295	spicats, Roth vi. 291, 29	7
Collettii, Hk. f		"	290	spinoss, Roxb vi. 29	1
coriacea, Wight		,,	292	spinosa, Wall ,, 29	4
crepitans, Ham		"	294	tiliæfolia, Kunth , 29	1
orispata, Roxb		,,	296	tomentosa, Heyne 28	
cylindrica, Vitm	•••	"	296	trinervia, Roxb vi. 289, 29	2
cymosula, Hemsl		"	291	triphylla, Ham vi. 28	
dæmona, Roxb	•••	"	289	triphylla, Linn ,, 28	_
decemangularis, Ham.	•••	,,	295	triphylla, Russ ,, 28	9
decipiens, Hk. f		,,	293	triphylla, Wall ,, 29	0
deflexa, Hk. f	•••	"	293	Tunga, Ham ,, 29	-
deltoides, Wall	•••	"	291	versicolor, Ham ,, 29	_
Devipata, Ham	•••	"	2:#6	virosa, Wall 28	-
digitata, Mill	•••	"	289	Wallichii, Hk. f ,, 29	_
echinata, Ham	•••	"	291	Wightii, Hk. f ,, 29	
fasciculata, Rosb	•••	,,	296	DIOSCOREACE vi. 28	8
gibbiflora, Hk. f		,,	294	Diospermum Metzianum,	
glabra, Rosb	•••	"	294	Sch., vide Oiospermum iii. 22	8
-				•	

-Diospermum Vol. Page	Diospyros	V ol.	Page
molle, Deless, vide Deca-	hirsuta, Linn. f	***	
neuron iii. 227	Library Titler	. ,,	566
Diospyros, Linn iii. 553	TT 0 -1 322 TT:	. ,,	570
? acuminata, Wall v. 172	insculpta, Ham		564
acuta, Thw iii. 561	!!!» /// // // // // // // // // // // // /	. ,,	565
affinia, Thw ,, 566	Tali Lina	,,	555
affinis, Hiera ,, 567	Kurzii, Hiern	,	559
amæna, Wall ,, 562		i. 562	, 571
apiculata, Hiern ,, 553	lanceolata, Wall	. iii.	556
argentea, Griff ,, 569	Takes Times	. ,,	555
Arnottiana, Mig iii. 560, 566	1 11 777 11	. ;	5 6 8
assimilis, Bedd iii. 558	1 7 7 772	. ,,	565
attenuata, Thw ,, 561		. ,,	56 8
bracteata, Roxb ,, 555		. ,,	554
Brandisiana, Kurs ,, 570	melanoxylon, Rowb		564
burmanica, Kurz ,, 565	melanoxylon, Hiern		563
busifolia, Hiern ,, 559	microphylla, Bedd		559
calycina, Bedd ,, 557		i. 555	571
canarica, Bedd ,, 568	Moonii, Thw	***	566
Candolleans, Wight , 566	? Moonii, Hiern		569
Candolleana, Miq ,, 560	multiflora, Wall	-	562
Candolleana, Thw ,, 566	nigricans, Wall		557
capitulata, Wight ,, 560	nigricans, Dalz		558
cerasifolia, D. Don i. 285	nilagirica, Bedd	• • •	5 66
chartaces, Wall iii. 571	oblonga, Wall		569
chinensis, Bl ,, 555	obovata, Wight		540
Ohloroxylon, Rowb ,, 560	oleifolis, Wall	•	5 67
alaminama (Mareka 559	oligandra, Bedd		566
sandifolia Dowh 555	oocarpa, Thw		560
costata, Carr ,, 555	opaca, Clarke		567
onemonate Thun 567	oppositifolia, Thw		565
documb alla Konn 554	orixensis, Wight		571
desiminar (Taules	ovalifolia, Wight		557
densifiors, Wall ,, 570	pachyphylla, Clarks		568
discolor, Willd, 569	Packmanni, Clarke		564
Juhin Wall 584	paniculate, Dalz	•••	570
Ebenaster, Roxb ,, 558	pilosula, Wall	••	554
Ebenum, Kænig ,, 558	pilosula, Kurz	•••	554
Ebenum, Hiern ,, 558	pruriens, Dalz	••	558
ehretioides, Wall ,, 559	punctata, Done		555
elegane, Clarke " 571	pyrrhocarps, Miq	••	571
Embryopteris, Pers ,, 556	quesita, Thw		560
ensculpta, Bedd ,, 564	racemosa, Roxh		556
exsculpta, Dalz. & Gibs " 563	ramiflors, Rozb	•••	569
exsculpta, Ham ,, 564	Rozburghii, Carr	•••	555
flaviouns, Hiern ,, 562	Roylei, Wall		572
flavicans, Hiera ,, 563	rubiginosa, Roth	•	568
foliolosa, Wall " 556	rugosula, Br	••	555
? frondosa, Wall i. 92	sapotoides, Kurs		562
frutescens, Hasak iii. 570	Schi-Tse, Bunge	•••	555
Gardneri, Thw ,, 561	serrata, Ham :		285
glauca, Rottl ,, 560	stricta, Roxb iii.		
glutinosa, Koen " 556	stricta, Hiern	***	
Goindu, Dalz ,, 555	sylvatics, Rozb		559
grata, Wall ,, 571	sylvatica, Wall	••	555
Helferi, Clarks , 569	Thwaitesii, Bedd		566
heterophylla, Wall ,, 555	tomentoss, Rozb		183
• • • • • • • • • • • • • • • • • • • •	•		

Diospyros	Vol.	Page	Diploclinium	Vol	Page
tomentosa, Lamk	iii.	560	1 5	ii.	
Toposis, Ham	,,	556	D	,,	635
Tupru, Ham	"	563		i.	1 01
undulata, Wall	>>	5 68	1 7 17 361	,,	101
undulata, Hiern	77	568		,,	101
vaccinioides, Wall	"	559	pictinervis, Miers	,,	101
variegata, Kurz	"	557	Diplocoszeylanica, Bureau .	▼.	488
venosa, Wall	17	572		i.	227
Waldemarii, Klotz	"	555		Vi.	
Wightiana, Wall	"	564		,,	167
sp., Griff	'n	568		,,	167
Diotacanthus, Benth	iv.	515	Diplomorpha canescens, C. I	_	105
albiflorus, Benth	"	515	Mey	▼.	195 285
grandis, Benth Dipoadi, Medic	"	515 345	1 1 0 4 35	,,	195
T	V 1.	346	virgata, C. A. Mey	•• ,,	195
hadansians Dalas	"	347	? viridiflora, C. A. Mey		~~~
minor III. £	"	346	Diplopappus asperrimus, DC asperulus, DC		253
montanum, Baker	"	346	deplostephioides, Hk.f. &	"	251
serotinum, Medic	"	346	elegans, Hk. f. & T		250
unicolor, Baker	"	346	1 7 47	·· ,,	252
Diperium cylindricum, Desv.	vii.	158	molliusculus, Lindl.	,,	251
Dipetalum biloculare, Dalz.	i.	497	molliusculus, Lindl Roylei, DC	•• ;;	256
Diphyes capitata, Bl	₹.	759	Diplopenta pedunculosa, Ale	f. i.	332
Diphylan urceolata, Hk. f	vi.	165	Diplophyllum cardiocarpun		
Diplachne, Beauv	vij.	32 8	1 ° - 1 ° 1 ° 1 ° 1 ° 1 ° 1 ° 1 ° 1 ° 1	iv.	295
elongata, Hochst	"	316		vi. 26	, 178
fusca, Beauv	"	329	Championi, Hk. f	vi.	26
Gatacrei, Stapf	,,	329	Diplosiphonoryzetorum, Den	e. v.	661
indica, Spreng	"	82 9	Diplospora, DC	iii.	122
poæformis, Hochst	"	316		,,	123
Diplacrum caricinum, Br	vi.	688		,,	124
tridentatum, Brong	,,	688		,,	123
zeylanicum, Nees	."	688		,,	124
Diplanthera, R. Br	ì₹.	385	Griffithii, Hk . f	,,	124
bancana, Scheff	"	385		22	125
Diplanthera, Thou	Vì.	570		,,	124
tridentata, Steinh sp., Griff	"	570 663		,,	124 123
Diplarche, Hk. f. & T	v. iii.	462		,,	124
multiflora, Hk. f. & T		462		,,	128
pauciflora, Hk. f. & T	"	462	Diplostemon octandrum, Mic	,, g. ii.	571
Diplasanthera lanosum, Donv.	vii.	196	5	-,	157
Diplocentrum, Lindl	vi.	78			157
congestum, Wight	"	78	(1 (0) -1.22 711 C U (7)	•• ,,	157
longifolium, Wight	"	78	1'4 517-11'	,,	552
recurvum, Lindl	"	78		ii.	667
Diplochilos hirsutum, Lindl.	vi.	167	To 1 . To 1	iii.	458
tongifolium, Lindl	"	167	30 1 //1 . 7 .	. ,,	459
Diplochlamys Griffithianus,				,,	458
Mueli	v.	433		,,	459
Diplochonium sesuvioides,			Diposium, Br	vi.	19
Fenzl	ii.	661	flavum, Ham	. ,,	7
Diploclinium Arnottianum,				₹.	770
Wight	ii.	641	paludosum, Rchb. f.	. vi.	19
biloculare, Wight	,,	650	pictum, Rchb. f	,,	19
cordifolium, Wight	"	641	plicatum, Ham	. ,,	. 6

			.	_		
Dipodium	Vol.		Dipterocarpus	,	ol. P	
ramentaceum, Ham	Vì.	4				295
Roniata, Ham	,,	6	insignis, Thw		"	298
scariosum, Ham	,,	8			"	295
sp., Griff v. 769,	770. vi.	195	Motleyanus, Hk. f		,,	299
DIPSACEE	iii.	215			"	296
		217	11 70			296
Dipsacus, Linn		218	obtusifolius, Teysm.		"	295
asper, Wall	*** 33			•••	"	296
atratus, Hk. f. & T	,,	218	pilosus, Rozb		77	
auriculatus, Royle	,,	218	pterygocalyx, Scheff	• •••		298
inermis, Wall	,,	217				297
inermis, Wall,	,,	218	scabridus, Thw		,,	298
Leschenaultii, Coult.	,,	218	tuberculatus, Roxb.	•••		297
Leschenaultii, Thw	,,	218	turbinatus, Gærtn.	f	,,	295
longicaulis, Wall		217	a a			295
	,,	217		•••		297
mitis, D. Don	*** 73	217			ï.	291
pilosus, Linn	*** 37		Dipterosperma, sp. Gri			164
Roylei, Klotz '	,,	217			1.	
strictus, D. Don	,,	217		•••	,11	164
strictus, Kurz	,,	217		••• . •••	iv.	49
Walkeri, Arn	,,	218	acutifolia, Maing		"	51
Dipseudochorion sagittifoli			11.13. 0140		"	50
	vi.	560	A 1114 C1 100		,,	51
Buchen		000	benghalensis, Coleb.			50
Dipteracanthus ? calycin	· · ·	468			"	50
Champ	iv.			•••	"	52
ciliatus, Nees	,,	408		•••	"	
ciliatus, Wall	,,	418		•••	, >1	51
dejectus, Nees	,,	412	Collyris, Wall.		´ ,,	51
erectus, Nees	,,	412	complex, Griff.		11	51
lanceolatus, Nees	,,	412) [10.11 XII . 11		11	50
	•••	412	A Side Dave		"	50
	,,	410				50
Nagchana, Nees	,,	412	Caissalii Ul		"	51
patulus, Nees	•••))		L'assats Dans	•••	"	50
prostratus, Griff	*** >>	412		•••	Ą	
prostratus, Nees	,,	412		•••	"	50
Sibua, Nees	,,	413		•••	"	49
urophyllus, Nees	,,	472	obovata, Griff		"	51
vagans, T. Anders	,,	411	orbicularis, Done.		11	49
sp., Hk. f. & T		411			"	50
	1.	294			**	50
DIPTEROCARPEA		295			•••	52
Dipterocarpus, Gartn. f.		298	TT1. A A.M		"	50
alatus, Rozb	;;			··· ···	ii.	693
alatus, A. DC	*** 77	297	Discopleura, sp., Bent		11.	000
angustifolius, W. & A.	,,	299	Discospermum apioc	arpum,	,	
Baudii, Korth	,,	296		•••	iii.	128
cordatus, Wall	,,	297		•••	**	128
cornutus, Dyer	i. 296, ii	. 312	Dalzellii, Thw		"	128
costatus, Gertin. f	i.	298	erythrospora, Thw.		,,	124
n	•••	299	sphærocarpum, Bed		,,	128
	,,	296	spherocarpum, Dala		-	123
orinitue, Dyer	,,	297	Discostigma acumi		99	
glandulosus, Thw	••• 91				i.	268
gonopterus, Turcz	,1	298	Planch. & Trian.		ı.	
grandiflorus, Wall	,,	297	febrile, Miq		99	260
grandiflorus, Griff	,,	299	merguense, Planch &	rran.	99	267
grandifolius, Toysm.	;;	297	rostratum, Hassk.		99	268
Griffithii, Miq	***))	299	seylanicum, Plane	oh. de		
hispidus, Thw	,,	296	Trian	•••	- 22	268
	•••	298	Disperis, Sw	vi.	168.	177
incanus, Rosb	4 ,,		,,,		,	

Disperis	Val	Page	Dittoceras	Val	. Page
neilgherrensis, Wight	•	169	Andersoni, Hk. f		
tripetaloides, Lindl		169	Diuroglossum rufescens, Turo		375
seylanica, Trimen		169	Diurospermum album, Edger		
Disporum, Salisb		359	Dobera, Juss	. iii	
calcaratum, D. Don		359	coriacea, A. DC		619
ceylanicum, Wight		360	glabra, A. DC	• • • • • • • • • • • • • • • • • • • •	619
fulvum, D. Don		360	Roxburghii. Planch		619
Hamiltonianum, D. Don		359	Dobines, Ham	•	696
Horsfieldii, D. Don	, ,,	360	vulgaria, Ham		696
latipetalum, Coll. & Hemsl		359	Dochafa flava, Schott		508
Leschenaultianum, D. Don		360	Docynia, Done	• •	869
multiflorum, D. Don		3 60	Griffithiana, Done		869
mysorense, Wight		36 0	Hookeriana, Done	. ,,	869
parviflorum, D. Don		360	indica, Done		869
Pitsutum, D. Don		360	Dodartes indica, Linn	iv	. 262
pullum, Salisb	,,	360	Dodecadenia, Nees	. T .	180
uniflorum, Baker	,,,	860		,,	181
Wallichii, D. Don & Kunth	٠,,	359	Griffithii, Hk. f	. ,,	181
Dissochæta, Bl	ʻii.	543	P paniculata, Hk. f	. ,,	181
anceps, Naud	,,,	546	paniculata, Meissn	. ,,	170
annulata, $Hk.f.$,,,	543	sp., Hk. f. & T	. ,,	169
astrosticta, Miq	,,	544	Dodonma, Linn	. i.	697
bancana, Miq	, ,,	544	angustifolia, Linn. f		697
bracteata, Bl	* **	543	arabica, Hoohst. & Steud	l. "	697
bracteosa, Naud	, ,,	543	Burmanniana, DC	. ,,	697
celebica, Bl	,,,	544	dioica, Roxb	. ,,	697
glauca, Bl	"	546	heterophylla, Hort	. ,,	697
gracilis, Bl	, ,,	544	microcarpa, DO	. 11	697
intermedia, Bl	29	544	pallida, Miq	. ,,	697
microcarpa, Naud	99	544	pentandra, Griff	: "	697
ovalifolia, Naud	"	544	spathulata, Sm.	. ,,	697
palembanica, Miq	"	546	viscosa, Linn	. ,,	697
pallida, <i>Bl.</i>	"	544	Wightiana, Bl	•••	697
punctulata, Hk. f	"	543	sp., Hohen	•	697
spoliata, Naud		545 544	Dolonges		669
superba, Naud.		525			378
Dissotis Finlaysonii, Triana Distemon, Wedd		588	arcuata, Clarke orispa, Seem	••	880
		588	#alaaka Ga	••	379 380
grossum, Wedd indioum, Wedd	"	588	T . " O	•	380
	iv.	000) TOL		879
Distemon, Ehrenb angustifolius, Ehrb. &					880
Hempr		250		,,,	379
glandulosus, Ehrb.&Hempr		249	Daliahan Linn		209
Distylium, Sieb. & Zucc	ii.	426	Lautatia Wall		216
indicum, Benth		427	handalanda Yasa		209
racemosum, Sieb. & Zucc.	99 99	427	biflorus, Linn	-	210
Dithyrocarpus Meyenianus,	"		blandus, Grah	• ••	218
Kunth	vi.	890		•••	210
paniculatus, Kunth		39 0	bracteatus, Baker bracteatus, Wall	•••	235
petiolatus, Wight	"	390	bulbosus, Linn	•••	207
Rothii. Wight	"	890	candicans, Wall	4	226
rufus, Kunth	"	390	Catiang, Linn	•••	205
undulatus. Wight	"	890	ciliatus, Klein	•••	210
Dittelasma, Hk. f	i.	671	conspersus, Grah		218
Rarak, Hk. f i.	672,	685	coriaceus, Grah		196
Dittoceras, Hk. f	iv.	48	crassus, Grah	•••	218

Dolichos	ΨAI	Page	Dolichos	Vol. 1	Page
Curtisii, G. Don	• • •	209	viridis, Ham		199
cuspidatus, Grah	-	209	virosus, Rozb		196
3		207	Dollinera, Endl	,,	166
	•••	202	Dolomicsa macrocephala, DO		878
		215	Dombeya phænicea, Cav		871
	•••	195	N		
ensiformis, Linn		92	Donggodes RI	•	286
fabæformis, L'Herit	•••		Donacodes, Bl		
falcatus, Klein		211 224	Donas arundinaceus, Beauv		909
fatmensis, Hochst. & Stoud	• 99		benghalensis, Beauv		303
festivus, Wall	• 99	209	bifarius, Trin		305
ficifolius, Gran	• 11	199	Thouarii, Beauv		300
Finlaysonianus, Grah	• 99	218	Donas, Lour		258
gangeticus, Roxb	• . 33	205	Arundinastrum, Lour	•	
giganteus, Willd	. ,,	186	Dondisia horrida, Korth	iii.	185
gladiatus, Jaoq	. ,,	196	Leschenaultii, DC		135
glutinosus, Roxb	• ,,	225	Doodia alopecuroides, Roxb	. ii.	156
grandifolius, Grah	• 99	198	crinita, Roxb	• ••	155
Lablab, Linn	. ,,	209	hamosa, Roxb	• 99	156
lanceolatus, Grah	. ,,	210	lagopodioides, Roxb	* **	156
lignosus, Linn	. ,,	209	_ picta, Roxb	, ,,	155
luteolus, Jacq	. ,,	205	Doona, Thw	. i.	311
luteus, Sw	. ,,	205	affinis, Thw	"	811
macrodon, Grah		225	congestifiors, Thw	**	812
medicagineus, Lam	. ,,	223	cordifolia, Thw	, ,,	312
medicagineus, Roxb		216	Gardneri, Thw	. ,,	812
minimus, Linn		223	macrophylla, Thw	, ,,	812
monachalis, Brot		205	nervosa, Thw		311
obcordatus, Roxb		196	ovalifolia, Thw	. ,,	812
ornatus, Wall		216	trapesifolia, Thw		811
ovatus, Grah		211	venulosa, Thw		818
phaseoloides, Roxb		199	zeylanica, Thw		311
pilosus, Roxb		207	Dopatrium, Ham	9	273
prostratus, Kon	•••	210	junceum, Ham	. ,,	274
pruriens, Linn		187	lobelioides, Benth		274
psoraloides, Lamk		92	nudicaule, Ham		274
punctatus, W. & A	•••	218	Doratanthera linearis, Benth		250
purpureus, Linn	•••	209	Dorema, sp., Hk. f. & T	. ii.	708
reticulatus, Ham	••	213		. 81,	178
rhynchosioides, Miq	•••	218	Braceana, Hk. f	. vi.	196
rotundifolius, Roxb	•••	196	pulcherrima, Lindl		31
rufescens, Grah	•	231		. 31,	196
scarabæoides, Linn		215	Wightii, Benth v		196
scarabæoides, Roxb.		216	Doronioum, Linn	•••	882
sinensis, Linn		205	Arnottii, DC		844
Soja, Linn		184	calcaratum, Roxb		297
spicatus, Wall ii	. 198		Candolleanum, W. & A		845
subsequalis, Grah	• • •	211	Falconeri, Clarke	••	888
subcarnosus, W. & A		211	Gardneri, Clarke	••	848
*suffeitus, Grah		212	hewrense, Dals		346
tetragonolobus, Linn.		211	Hookeri, Clarke		882
tomentosus, Roth		225	Lessingianum, W. & A	•••	845
		205	linifolium, DC		848
		202	Pardalianches, Linn	•••	882
		211	? reticulatum, Dalz. & Gibs	. ,,	848
trilobatus, Wall		218	reticulatum, Wight		847
uniforus, Lam		210	Roylei, DC		332
vestitus, Grah		230	rupestre, Wight	•••	845
	- 71			"	

Doronicum	Vol.	Page	Draba	Vol.	Page
scorpioides, Clarke iii.	882	, 333	Wahlenbergii, Hartm	i.	143
tenuifolium, Wight		346	1 50	vi.	327
tomentosum, Wight	,,	346		,,	327
Walkeri, Arn	,,	345	atro-purpurea, Roxb	,,	330
Wightii, DC	"	844	aurantiaca, Wall	,,	329
Dorstonia, Linn	٧.	494	brachyphylla, Kurz	,,	328
Grifithiana, Kurz	"	547	brachystachys, Hk. f		828
indica, Wall	"	494	Cantleyi, Baker	., ,,	331
Doryctandra, Hassk	i.	186	elliptica, Thunb	. ,,	330
Rozburghii, Hasek	"	186	elliptica, Thunb. & Dallm	1, ,,	329
Dossinia, Morr	٧ì.	102		,,	327
lanceolata, Lindl	"	109		,,	331
marmorata, Lindl	;,	96		,,	327
Douepia tortuosa, Camb	1.	158	gracilis, Wall	. ,,	330·
Dowomma acuminatum, Miers	ii.	509		•• ,,	327
angustatum, Miers	"	509		,,	327
cylindrostachyum, Miers	"	509 509	Griffithii, Regel	•	880
macrostachyum, Miers	"	509	Helferiana, Wall	. ,,	830
magnificum, Miers	"	509	Heyneana, Wall		829
pendulum, Miers	· #		Jackiana, Wall javanica, Kunth	•••	331 330
rigidum, Miers ii. 510	, III. ii.	509	7		331
praba, Linn	i.	141	1 731 1	••	330
		142	1 1 10 1	•••	330
	"	142		. ,,	328
. 1 1 1771	"	142	M-1 1777. C	•••	329
alpina, Linn	"	142	9 and Dalam	. ,,	329
altaica, Bunge	"	143	pachyphylla, Kurz		329
androsacea, Willd	"	143	petiolata, Hk. f		331
confusa, Ehrh	"	143	Porteri, Baker		328
elata, Hk. f. & T	"	142	spicata, Roxb	••	328
elegans, Boiss	"	142	spicata, Baker	•••	828
ellipsoidea, Hk. f. & T	"	144	terminalis, Jack	••	331
fladnizensis, Wulf	"	143	terminalis, Wight		329
glacialis, Adams	,,	142	terniflora, Roxb		328
glomerata, Royle	"	143	terniflora, Wall	. ,,	830
gracilis, Ledeb	,,	143	ternifolia, Kurz	. ,,	828
gracillima, Hk. f. & T	"	144	Thwaitesii, Regel		829
helvetica, Schleich	39	143		i. 82 8,	
himalayensis, Klots	"	143	Dracocephalum, Linn		800
incana, Linn	"	143	Dracocephalum, Linn	. iv.	664
incompta, Stev	"	142	acanthoides, Edgew	. ,,	666
lactea, Kar. & Kir	"	143	bipinnatum, Rupr	. ,,	666
lapponica, Wahl	"	143	erectum, Royle		668
lasiophylla, Royle	"	143	Govanianum, Benth	•	663
linearis, Boiss	**	144	heterophyllum, Benth	• ,,	665
muralis, Linn	"	144	Hookeri, Clarke		666
ochroleuca, Bunge	"	142	inderiense, Kar. & Kir		667
polytricha, Ledeb	"	142 143	moldavicum, Linn		665 665
pygmea, Turcs	"		nutans, Linn		660
radicans, Royle	**	142 142	pinnatum, Linn Royleanum, Benth		667
setosa, Royle	77	148	TO 1 411 TO 1	•••	666
siliquosa, Bieb stellatu, Jacq	"	143			665
	"	144	speciosum, Benin stamineum, Kar. & Kir	• "	666
	142,		Dracontium polyphyllum,	• ,,	300
verne, Linn	i.	145		. vi.	514

Dr acontium	1	Vol. :	Page			ol. I	
spinosum, Linn	8	vi.	550	Duhaldea chinensis, DC	••	iii.	
Dracontomelum, Bl		ii.	43	Dumasia, DC	••	ii.	182
mangiferum, Bl	•••	,,	43	congesta, Grah		**	183
puberulum, Miq		"	43			"	188
sylvestre, Bl			43	7.1		"	183
Drapiezia multiflora, Bl.	•••	"	860	1			183
			46	- 11		"	183
Dregea, E. Mey	•••	i▼.	46	70	••	i.	834
volubilis, Benth	•••	,,					
Drepananthus, Maing.	•••	i.	59				217
pruniferus, Maing	•••	"	56		••	"	216
ramuliflorus, Maing.	•••	"	56		••	"	316
Drimycarpus, Hk . f	•••	ii.	86	circinalis, Baker	••	"	219
racemosus, Hk. f		"	36	conspersa, Benth	••	,,	218
Droguetia, Gaud		₹.	593	debilis, Baker		,,	218
diffusa, Wedd	•••	"	593	ferrugines, W. & A			217
pauciflora, Wedd			593	f 7		"	204
D		ï.	424	TT 1 TET 0. 4	••	,,	217
			424	Tr	•••		218
		"	424	7 - 4 ' A . 2 ' THE A		**	217
Findlaysoniana, Wall.		"	424		•••	"	218
foliosa, Hk. f		,. .			••	"	218
gracilis, Hk. f	•••	"	424		••	"	218
indica, Linn	•••	"	424		•••	. "	
intermedia, Royle		"	425		•• 1	iy.	560
intermedia, W. & A.	•••	"	425		••	ī.	350
Lobbiana, Turcz		,,	424		•••	"	851
lunata, Ham		"	424	Oxleyanus, Griff	••	,,	351
peltata, Sm		"	424	zeylanicus, Gardn	•••	. 11	350
serpens, Planch		"	424			***	351
T			423	TO 111 11 11 000 00		เจ้า	429
				Duthies. Hack. VII. 282. 30	120. 7		
	 hed	ii.		Duthies, Hack. vii. 282, 36 bromoides, Hack vi			
Dryadanthe Bungeana,	Led.	ii.	846	bromoides, Hack vi	ii. S	282,	362
Dryadanthe Bungeana, Dryandra oleifera, Wall.	Led.	ii. V.	846 384	bromoides, Hack vi oligostachya, Stapf	ii. 2 '	282, vii.	36 2 283
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd	Led.	ii. ▼. i.	846 384 244	bromoides, Hack vi oligostachya, Stapf Dyera, Hk. f	ii. 2	282, vii. iii.	362 283 643
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd. cordata. Willd	Led.	ii. ▼. i.	346 384 244 244	bromoides, Hack vi oligostachya, Stapf Dyera, Hk. f costulata, Hk. f	ii. 2	282, vii. iii. "	362 283 643 644
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd. cordata, Willd extensa, Wall	Led.	ii. ▼. i.	846 384 244	bromoides, Hack vi oligostachya, Stapf Dyera, Hk. f oostulata, Hk. f laxiflora, Hk. f	ii. 2	282, vii. iii. ,,	362 283 643 644 644
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum cauliflo	Led.	ii. v. i. ,,	846 384 244 244 244	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f Dymcsewiezia, Horan.	ii. 2	282, vii. iii. ,,	362 283 643 644 644 248
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd. oordata, Willd. extensa, Wall. Drymispermum cauliflo Thw.	Led.	ii. v. i. ,,	846 384 244 244 244 199	bromoides, Hack vi oligostachya, Stapf Dyera, Hk. f costulata, Hk. f. laxiflora, Hk. f. Dymczewiczia, Horan. capitata, Horan	ii. 2	282, vii. iii. ,,	362 283 643 644 644 248 249
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd oordata, Willd Extensa, Wall Drymispermum cauliflo Thw Drymoda, Lindl	Led.	ii. v. i. ,,	846 384 244 244 244	bromoides, Hack vi oligostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f. Dymcsewiezia, Horan. capitata, Horan elata, Horan	ii. 2	282, vii. iii. ,,	362 283 643 644 644 248 249
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd. oordata, Willd. extensa, Wall. Drymispermum cauliflo Thw.	Led.	ii. v. i. ,,	846 384 244 244 244 199	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f. Dymczewiczia, Horan. capitata, Horan. elata, Horan.	ii. 2	282, vii. iii. vi.	362 283 643 644 644 248 249 249
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl Drymophlæus singapore	Led.	ii. v. i. ,, v. v.	846 384 244 244 244 199 781	bromoides, Hack vi oligostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f. Dymcsewiezia, Horan. capitata, Horan elata, Horan	ii. 2	282, vii. iii. vi.	362 283 643 644 644 248 249 249 410
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl Drymophlæus singapore	Led.	ii. v. i. ,, v. v.	846 384 244 244 244 199 781	bromoides, Hack violigostachya, Stapf Dyera, Hk. f laxiflora, Hk. f Loymczewiczia, Horan capitata, Horan elata, Horan marginata, Horan Dyschoriste cernua, Nees	ii. 2	282, vii. iii. ,,, vi. ,,, iv.	362 283 643 644 644 248 249 249
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd extensa, Wall Drymispermum cauliflo Thw Drymoda, Lindl picts, Lindl Drymophæus singapore Hk. f	rum,	ii. v. i. " v. v. v. v. vi.	846 384 244 244 244 244 199 781 781	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f capitata, Horan elata, Horan marginata, Horan Dyschoriste cernua, Nees depressa, Nees	ii. 2	282, vii. iii. vi. vi.	362 283 643 644 644 248 249 249 410
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd Drymispermum cauliflo Thw Drymoda, Lindl Drymodhaus singapore Hk. f Drypetes bengalensis, Spi	rum,	ii. v. i. v. v. v. v. v. v. v.	346 384 244 244 244 199 781 781 413 328	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f Dymczewiczia, Horan. capitata, Horan elata, Horan marginata, Horan Dyschoriste cernua, Nees depressa, Nees littoralis, Nees	ii. 2	282, vii. iii. ,,, vi. ,,, iv.	362 283 643 644 248 249 249 249 410
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picta, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi Drypetes	rum,	ii. v. i. " v. v. v. v. vi.	846 384 244 244 244 244 199 781 781	bromoides, Hack violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. Dymczewiczia, Horan. capitata, Horan. lata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees Littoralis, Nees Dysodidendron ceylanicus	ii. 2	282, vii. iii. vi. vi.	362 283 643 644 248 249 249 249 410
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd	rum,	ii. v. i. v. v. v. v. v. i.	346 384 244 244 244 244 199 781 781 413 328 212	bromoides, Hack violigostachya, Stapf Dyera, Hk. f	ii. 2	282, vii. iii. ", vi. ", iv. "	362 283 643 644 644 248 249 249 410 410
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl Drymodhlæus singapore Hk. f Drypetes bengalensis, Spi DRYPIDEE Dryptopetalum coriac Arn	rum, ensis, eum, i. 62	ii. v. i. v. v. v. v. i. v. i.	346 384 244 244 244 244 199 781 781 413 328 212	bromoides, Hack violigostachya, Stapf Dyera, Hk. f	ii. 2	282, vii. vi. iv. 	362 283 643 644 644 248 249 249 410 410 410
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi DRYPIDEE Drypopetalum coriac Arn membranaceum, Miq.	rum, ensis, eum, i. 62	ii. v. i. v. v. v. v. i. i. ii.	\$46 384 244 244 244 244 199 781 781 413 328 212 440 441	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. laxiflora, Horan. capitata, Horan. clata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn. Wightii, Gardn.	ii. 2	282, vii. iii. vi. vi. vi. vi. vi. vi. vi.	362 283 643 644 644 248 249 249 410 410 193 192 193
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picta, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi DRYPIDEE Dryptopetalum coriac Arn membranaceum, Miq. Duabanga, Ham	rum, ensis, eum, i. 62	ii. v. i. v. v. v. vi. v. ii. ii. ii.	846 384 244 244 244 244 199 781 781 413 328 212 440 441 578	bromoides, Hack violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. Dymczewiczia, Horan. clata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn. Wightii, Gardn. Dysophylla, Bl	ii. 2	282, vii. iii. "". iv. "". iii.	362 283 643 644 644 248 249 249 410 410 193 687
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picts, Lindl Drymophlæus singapore Hk. f Drypetes bengalensis, Spi DRYFIDEE Dryptopetalum coriac Arn membranacsum, Miq. Dusbanga, Ham sonneratioides, Ham.	rum, ensis, ensis, i. 62!	ii. v. i. v. v. v. v. ii. ii. ii. ii. ii	846 384 244 244 244 199 781 781 413 328 212 440 441 578 579	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f Dymcsewiezia, Horan elata, Horan marginata, Horan Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn Wightii, Gardn Dysophylla, Bl aurioularia, Bl		282, vii. iii. " vi. " iv. " iv. "	362 283 643 644 644 249 249 410 410 193 687 688
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl Drymodhlæus singapore Hk. f Drypetes bengalensis, Spi DRYFIDEE Dryptopetalum coriac Arn membranaceum, Miq. Duabanga, Ham sonneratioides, Ham. Dubrueilia peploides, G	rum, reng eum, i. 624	ii. v. i. v. v. v. vi. v. ii. v. v. v. v. v. v. v.	846 384 244 244 244 199 781 781 413 328 212 440 441 579 554	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f Dymcsewiezia, Horan elata, Horan marginata, Horan Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn Wightii, Gardn Dysophylla, Bl aurioularia, Bl Benthamiana, Hance	ii. 2	282, vii	362 283 643 644 644 248 249 249 410 410 193 687 638 639
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd	rum, reng i. 624	ii. v. i. v. v. vi. v. ii. ii. ii. v. iii. iii.	846 384 244 244 244 199 781 781 413 328 212 440 441 579 554 409	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f pymcsewiezia, Horan elata, Horan marginata, Horan Dyschoriste cernua, Nees depressa, Nees littoralis, Nees pysodidendron ceylanicus Gardn glomeratum, Gardn Wightii, Gardn Dysophylla, Bl Benthamiana, Hance orassicaulis, Benth	ii. 2	282, vii. iii. " vi. " iv. " iv. "	362 283 643 644 644 248 249 249 410 410 410 193 687 638 640
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picts, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi Dayfide Dryptopetalum coriac Arn membranaceum, Miq. Dubyaga, Ham Sonneratioides, Ham. Dubrueilia peploides, G. Dubyæa, DC hispida, DC	rum, rensis, eum, i. 62i	ii. v. i. v. v. vi. v. ii. ii. ii. v. iii. iii.	846 384 244 244 244 199 781 781 413 328 212 440 441 579 554	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. laxiflora, Hk. f. Dynczewiczia, Horan. capitata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn. Wightii, Gardn. Dysophylla, Bl. aurioularia, Bl. Benthamiana, Hance orassicaulie, Benth oruciata, Benth.	ii. 2	282, vii	362 283 643 644 644 248 249 249 410 410 410 193 687 638 640 689
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum cauliflo Thw Drymoda, Lindl picts, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi DRYFIDEE Dryptopetalum coriac Arn membranaceum, Miq. Duabanga, Ham sonneratioides, Ham. Dubrueilia peploides, G. Dubyæa, DC hispida, DC Duchassainaja ovalifoli	rum, rusis, reng. eum, i. 629	ii. v. i. v. v. v. ii. v. ii. ii. ii. ii	846 384 244 244 244 199 781 781 413 328 212 440 441 578 579 554 400	bromoides, Hack violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f Dymcsewiezia, Horan elata, Horan marginata, Horan marginata, Horan Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn Wightii, Gardn Dysophylla, Bl auricularia, Bl Benthamiana, Hance orassicaulis, Benth cruciata, Benth erecta, Dalz	ii. 2	282, vii	362 283 643 644 644 248 249 249 410 410 193 687 638 640 641
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd	rum, rum, reng i. 624	ii. v. i. v. v. vi. v. ii. iii. v. iii. v. iii. v. iii.	846 384 244 244 244 199 781 781 413 328 212 440 441 579 554 409	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. Dymcsewiezia, Horan. elata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees littoralis, Nees glomeratum, Gardn. Wightii, Gardn. Dysophylla, Bl. auricularia, Bl. Benthamiana, Hance crassicaulie, Benth. cruciata, Benth. erecta, Dalz.	ii. 2	282, vii	362 283 643 644 644 248 249 249 410 410 193 687 638 640 641 641
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picta, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi DRYPIDEE Dryptopetalum coriac Arn membranaceum, Miq. Duabanga, Ham sonneratioides, Ham. Dubrueilia peploides, G. Dubyaa, DC hispida, DC Duchassaingia ovalifoli Walp Ducheenea chrusantha. Mid Ducheenea chrusantha.	rum, ensis, i. 62i	ii. v. i. v. v. v. vi. v. ii. ii. iii. iii. iii.	846 384 244 244 244 199 781 781 413 328 212 440 441 578 579 554 400	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f laxiflora, Hk. f laxiflora, Horan elata, Horan marginata, Horan pyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn ylomeratum, Gardn Wightii, Gardn Dysophylla, Bl auricularia, Bl Benthamiana, Hance orassicaulis, Benth cruciata, Benth erecta, Dalz gracilis, Dalz	m,	282, vii	362 283 643 644 644 248 249 249 410 410 193 192 193 687 638 640 641 641 641
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picta, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi DRYPIDEE Dryptopetalum coriac Arn membranaceum, Miq. Duabanga, Ham sonneratioides, Ham. Dubrueilia peploides, G. Dubyaa, DC hispida, DC Duchassaingia ovalifoli Walp Ducheenea chrusantha. Mid Ducheenea chrusantha.	rum, ensis, i. 62i	ii. v. i. v. v. v. vi. v. ii. ii. iii. iii. iii.	846 384 244 244 244 244 199 781 781 413 328 212 440 441 578 579 554 409 410 189	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. laxiflora, Hk. f. Dymcsewiezia, Horan. elata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn. glomeratum, Gardn. Wightii, Gardn. Dysophylla, Bl. auricularia, Bl. Benthamiana, Hance crassicaulie, Benth. cruciata, Benth. cruciata, Benth. cruciata, Benth. cruciata, Benth. Gradilie, Dalz. gracilie, Dalz. Griffithii, Hk. f. Helferi, Hk. f.	m,	282, vii	362 283 643 644 644 248 249 249 410 410 193 687 638 640 641 641
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picta, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi DRYPIDEE Dryptopetalum coriac Arn membranaceum, Miq. Duabanga, Ham sonneratioides, Ham. Dubrueilia peploides, G. Dubyaa, DC hispida, DC Duchassaingia ovalifoli Walp Ducheenea chrusantha. Mid Ducheenea chrusantha.	rum, ensis, i. 62i	ii. v. i. v. v. v. vi. v. ii. ii. iii. iii. iii.	846 384 244 244 244 199 781 781 413 328 212 440 441 578 579 554 409 410 189 843 348	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. laxiflora, Hk. f. Dymcsewiezia, Horan. elata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn. glomeratum, Gardn. Wightii, Gardn. Dysophylla, Bl. auricularia, Bl. Benthamiana, Hance crassicaulie, Benth. cruciata, Benth. cruciata, Benth. cruciata, Benth. cruciata, Benth. Gradilie, Dalz. gracilie, Dalz. Griffithii, Hk. f. Helferi, Hk. f.	ii. 2	282, vii	362 283 643 644 644 248 249 249 410 410 193 192 193 687 638 640 641 641 641
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd cordata, Willd extensa, Wall Drymispermum caulifo Thw Drymoda, Lindl picta, Lindl Drymophlaus singapore Hk. f Drypetes bengalensis, Spi DRYPIDEE Dryptopetalum coriac Arn membranaceum, Miq. Duabanga, Ham sonneratioides, Ham. Dubrueilia peploides, G. Dubyaa, DC hispida, DC Duchassaingia ovalifoli Walp Ducheenea chrusantha. Mid Ducheenea chrusantha.	rum, ensis, i. 62i	ii. v. i. v. v. v. vi. v. ii. ii. iii. iii. iii.	846 384 244 244 244 199 781 781 413 328 212 440 441 578 579 554 409 410 189 843 843 843	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f. costulata, Hk. f. laxiflora, Hk. f. laxiflora, Hk. f. Dymcsewiezia, Horan. elata, Horan. marginata, Horan. Dyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn. glomeratum, Gardn. Wightii, Gardn. Dysophylla, Bl. auricularia, Bl. Benthamiana, Hance crassicaulie, Benth. cruciata, Benth. cruciata, Benth. cruciata, Benth. Griffithii, Hk. f. Helferi, Hk. f. linearis, Benth.	ii. 2	282, vii	362 283 643 644 644 249 249 410 410 193 193 687 639 640 641 641 641 641
Dryadanthe Bungeana, Dryandra oleifera, Wall. Drymaria, Willd	Led.	ii. v. i v. v. v. v. i. v. iii v	846 384 244 244 244 199 781 781 413 328 212 440 441 578 579 554 409 410 189 843 348	bromoides, Hack. violigostachya, Stapf Dyera, Hk. f costulata, Hk. f laxiflora, Hk. f laxiflora, Hk. f laxiflora, Horan elata, Horan marginata, Horan pyschoriste cernua, Nees depressa, Nees littoralis, Nees Dysodidendron ceylanicus Gardn glomeratum, Gardn Wightii, Gardn Dysophylla, Bl auricularia, Bl Benthamiana, Hance orassicaulis, Benth cruciata, Benth cruciata, Benth gracilis, Dalz Griffithii, Hk. f Helferi, Hk. f linearis, Benth linearis, Wall	ii. 2	282, vii	362 283 643 644 644 248 249 249 410 410 193 687 638 640 641 641 641 641 640 639

Dysophylla	17a1	. Page	Ebermaiera	47-1	D
pentagona, Clarke	•			. i⊽.	Page 396
pumila, Benth		640	gracilis, T. Anders		402
amaduidalia Daudh		639	Griffithiana, T. Anders		400
Anna Market Danks	"	639	Helferi, T. Anders iv.	399	
manage III. f		638	humilis, Nees	, 000	396
	"	639	1 2 77 7.		397
18 18 18 17 12	"	638	lamanalaka IIli		397
ada11-4a 7041	"	640	lasiahatana 37		400
Ohnahaii TD. 4	"	642			395
-4 D	"	636	1		399
A-A	,•	689	Maclellandii, T. Anders		401
4	"	641	macrophylla, T. Anders		400
malastina Domah	"	639	merguensis, T. Anders	•	402
	"	639	1	• • • • • • • • • • • • • • • • • • • •	401
CI: 65	"	689	manionlata 777-11	•••	401
	"	638	manusidana (T. A. Jana	.,	402
13	?"	546	mal-had 37	••	396
TO 9 1 TT:	1.	548	16.		401
himantaniform TVL f	"	546			398
handings Wise	"	546	I Simonell M A. Jana	••	399
anniidamm Wann	"	549			396
Championii, Hk. f. & T	"	562			396
	"	549	spatulata, Nees		398
	"	549	Staurogyne, Nees		398
-manda III.	"	547	Staurogyne, T. Anders		400
	"	552	subpaniculata, Hassk		397
grandistorum, Roem	"	549	thyrsoides, Nees		267
Griffithii, Hiern	"	548	thyrsoidea, Kurz	• • • • • • • • • • • • • • • • • • • •	398
Hamiltonii, Hiern	"	546	trichocephala, Miq		
macrocarpum, Thw Maingayi, Hiern	"	547	velutina, Nees		397 397
	"		zeylanica, Nees		
malabaricum, Bedd	"	548 552	seylanica, T. Anders		397
multijugum, Arn	"	548	sp., Wall iv.	396,	
pallens, Hiern	"	552	Ecbolium, Kurz		544
paniculatum, Arn	,,	547	Linneanum, Kurz	"	544
procerum, Hiern	"	547	Eccoilopus andropogonoides,	-4:	1:00
thyrsoideum, Griff	"	548	Steud Eccremanthus eximius, Thw.		108 691
sp., Bedd	"	020		iii.	
Ebenacea, sp., Griff	***	562			660
		183	barbata, Miq brachiata, A. DC	"	662
		549		"	660
731 7	ii.	140		"	662
f f. E. C		141	Echaltium piscidium, Wight	;;;	629
3 3 - Y & Q	"	141		iv.	414
	**	140	A 3 1 - Ó11 -		415
tragacanthoides, J. & Sp.	"	140	-44 -4 '37	"	414
	" i▼.	395	TD	"	415
angustifolia, T. Anders		398		"	469
amandar Mass	"	398	calycinus, Nees longistylus, Clarke	"	415
	"	398		"	415
	"	899	D	"	415
D 33: (111 -	"	402	/T A 3	,,	415
andana M Andani	33	402	sp., T. Anders Echinalysium articulatum,	"	310
314C	"	397	m. · ·	vii.	908
	**	400	and the American		
3	"	395			306 268
glauca, T. Anders iv.	30g		Echinocalys, Benth		
goods, I. Augers IV.	, JU	001 I	Echinocarpus, Bl	i.	899

Wahinaaan		_				
Echinocarpus	•	Page 399	Echites acuminata, Roxb.		Vol. iii.	
assamious, Benth dasycarpus, Benth		400	affinis, R. & S	•••		670
Manan Danis	•	899	antidysenterica, Roxb.	•••	"	644
Sigun, Bl	•••	399	apozys, Voigt		"	664
sterculiaceus, Benth		400	brachiata, Wall	•••	"	662
tomentosus, Benth	•••	400	bracteata, Heyne	•••	"	665
Echinocaulos perfoliatus,	"		calycina, Wall		99	665
Hassk	v.	46	caryophyllata, Roxb.		"	665
Echinochloa commutata,			caryophyllata, Wall.	•••	99	664
Schult	vii		caudata, Burm	•••	**	655
Crus-corvi, Beauv	. ,,	81	conferta, Wall	•••	."	665
Crus-gaili, Beauv	* **	81	coriacea, Heyne	•••	iv.	6.
P dubia, R. & S	* **	81	coriacea, Wall	•••	iii.	668 664
eruciformis, Rchb. f	••	28	? cristata, Roth	•••	iŸ.	5
frumentacea, Link	"	32 31	cuspidata, Heyne	•••	iii.	665
glabrescens, Munro		= = =	cymosa, Wall			665
1. (a.4.1) a. (1.1.14	vii. U. ▼ii.		dichotoma, Heyne	•••	'n.	14
1. 2 2 1 O . 1 1 .		31	dichotoma, Roth	•••	iii.	66 ŧ
1 / / 1 Jan NY		31	dichotoma, Roxb	•••	,,	650
1 1 1. 1.0	•••	67	elegans, Wall		"	665
squarrosa, R. & S	,,	62	elliptica, Wall	•••	"	667
stagnina, Beauv	"	31	Pesculenta, Wall	•••	"	658
Echinologia polystachya,	"	-	frutescens, Wall		"	669
Н. В. К	vii.	58	glandulifera, Wall	•••	"	660
sp., Wail	,,	58	grandiflora, Roxb	•••	"	660
Echinolytrum dipsaceum,	"	-	grandis, Wall		4,,	661
Desv	٧i.	635	Heynei, Spreng	•••	. ,,	664
Echinops, Linn	iii.	358	hircosa, Roxb	•••	"	651
coriarius, Clarke	"	358	laviyata, Wall	•••	,,	666
cornigerus, DC	"	358	? lucida, D. Don	•••	"	658
echinatus, DC	"	358	? lucida, Wall	•••	,,	658
P Griffithianus, Boiss	. ,,	358	? macrantha, Spreng. macrocarpa, Wall	•••	,,	661
niveus, Wall	"	359	macrocarpa, Wall	•••	21	668
Echinopsilon divaricatus, Kar.			macrophylla, Roxb	•••	,,	661
& Kir	₹.	10	malabarica, Lamk	•••	"	662
sedoides, Moq	"	10	manubriata, Wall	•••	"	668 668
tibeticus, Hk. f. & T	"	10	marginata, Roxb	•••	"	662
Echinospermum, Sw	ì♥.	162	? micrantha, Wall	•••	"	660
barbatum, Lehm	"	163 164	monilifera, Wall Pala, Ham	•••	,,	642
canum, Benth	"	160	1	•••	"	668
cælestinum, Wight	"	161	paniculata, Koxb parviflora, Roxb	•••	"	666
glochidiatum, A. DC	"	163	4 10 1.1		." i▼.	6
intermedium, Ledeb minimum, Lehm	"	162		•••	nii.	668
? myosotistorum, A. DC	"	164	religiosa, Teysm. & Bin		"	653
patulum, Lehm	"	163	to the Total Dest	•••	"	663
Redowskii, Lehm))))	163	reticulata, Roth		iv.	5
semiglabium, Ledeb	"	163		,	iii.	667
sericeum, Benth	"	165			,,	642
spathulatum, Benth	"	164	tomentosa, Roth	•••	"	662
zeylanicum, Lehm	"	157	venenata, Roxb	•••	"	642
sp., Hk. f. & T	,,	161		•••	"	667
Echinus trisulcus, Lour	₹.	430	vestita, R. & S	•••	_"_	662
Echiochilon hispidissimum,					622,	
Tausch	iv.	176	1	•••	i▼.	
Echioglossum striatum, Rohb.f	. vi.	76	Eclipta, Linn	•••	111.	804
VOL. VII.				1	•	

Eclipta	υ	701	Page	Ehretia	W-1	Page
alba, Hassk		iii.	304	pyrifolia, D. Don		141
alba, Boiss	•••	,,	304	retusa, Wall		143
alba, Dalz. & Gibs		••	304	serrata, Roxb	"	141
erecta, Dalz. & Gibs.		"	304	Administration Dames	"	142
erecta, Lamk		"	304	1 4 D. 41		142
erecta, Linn		"	304	1 -171 -A- 387-31	i.	604
latifolia, Linn. f		"	305	117-11	iv.	145
marginata, Boiss		"	304	Wallichiana, Hk. f. & T		143
parviflora, Wall		"	305	\$87! L 42 167.77	"	143
manadous de T. Company		"	304	1 33	."	134
manada at a Da la	•••	"	305	What well to Min Don't	iv. i.	545
mmantured a M7-11	•••	"	305	2 interesting Well		545
· · · · · · · · · · · · · · · · · · ·	 iii. 3	ng.	307	Pintegerrima, Wall	"	010
J J 4 . XX7 . XX			305	Elachocroton asperococcus, Muell	_	475
77 1 4 999 11			307	W	٧.	
		ii.	631		▼.	201
darjeelingensis, Clarke		11.	632	Elwagnus, Linn	v.	201
177 January 11 July 178 - 1 -		??	5 34	angustifolia, Linn	"	201
1		iii.		arborea, Roxb	"	202
		"	534 534	armata, Ham	"	202
		,,	194	conferta, Roxb	• >	202
Edgeworthia, Meissn.		٧.		elliptica, Heyne	**	202
chrysantha, Lindl		"	195	ferruginea, A. Rich	"	202
Gardneri, Meissn		"	195	hortensis, M. Bieb	,,	201
papyrifera, Zuco		"	195	Kologa, Schl	,,	202
Edwardsia maderaspata			0~1	latifolia, Linn	,,	202
			251	Moorcroftii, Wall	,,	201
mollis, Royle			251	orientalis, Linn	,,	201
Ehretia, Linn	1	٧.	141	parvifolia, Wall	**	202
acuminata, Br		"	141	pyriformis, Hk. f	"	202
affinis, Wall	•••	17	142	reflexa, Done. & Morr	**	202
aspera, Roxb	•••	"	142	Simoni, Hort	"	202
buxifolia, Roxb		"	144	Thwaitesii, Sohl	,,	202
canarensis, Miq.	3	"	142	umbellata, Thunb	"	201
Championi, Wight & Gar	ran.	"	142	Wallichiana, Schl	,,	202
cuneata, Wight	•••	,,	145	Elæocarpus, Linn	i.	400
Cutranga, Ham	•••	"	142	Acronodia, Mast	"	408
dichotoma, Rottl	•••	"	142	acuminatus, Wall	**	406
Dicksoni, Hance	•••	,,	141	adenophyllus, Wall	,,	403
floribunda, Benth	•••	,,	142	amosnus, Thw	"	404
glabra, Roth	•••	,,	136	amygdalinus, Wall	,,	402
heterophylla, Spreng.	•••		144	? angustifolius, Wight	"	403
Heynii, R. & S	•••	"	142	apiculatus, Mast	,,	407
	•••	,,	141	aristatus, Roxb	,,	405
lævis, Benth	•••	,,	142	aristatus, Wall	,,	402
lanceolata, Heyne	•••		143	bracteatus, Kurz	,,	406
longiflora, Champ	•••	,,	144	ceylanious, Arn	N	406
macrophylla, Wall		••	141	Chackroula, Ham	"	408
microphylla, Lamk	•••	,,	144	copalliferus, Retz	91	313
mollis, Wall	•••		144	coriaceus, Hook	,,	404
obovata, R. Br	•••	,,	143	cuneatus, Wight	,,	402
obtusifolia, Hockst	•••	••	142	cyanocarpa, Maing	,,	406
ovalifolia, Wight	•••	,,	143	ferrugineus, Steud	"	406
	•••	,,	141	? Finlaysonianus, Wall	"	407
parallela, Clarke	;		143	floribundus, Bl	**	401
		,,	142	Ganitrus, Roxb	"	400
	,		142	glabrescens, Mast	"	403
punctata, Roth	,	,,	142	glandulifer, Mast	"	406
			-			

Limocarpus	,	7 61 1	Domo I	1	37-1	. Page
glandulosus, Wall	•••	i.	Page 403	Elateriospermum, Bl.	🔻	
grandifolius, Kurz		"	405	Maman 701	. ,,	382
Griffithii, Mast		"	408	1711 - A.S	ï.	250
grossa, Wall	•••	"	401	3772 - 1. A	,,	251
Helferi, Kurz	•••	"	402		. ,,	251
integer, Wall		"	408		,,	250
integrifolius, Lamk.	•	"	401		,,	251
Jackianus, Wall	•••	"	409	triandra, Schk	,,	251
Placunosus, Wall	i.	4Ö1,	402		., ,,	252
lancemfolius, Roxb		i.	402	ELATINEÆ	i.	250
lanceolatus, Wall		"	402	Elatostema, Forst	v .	562
leptostachya, Wall.	•••	,,	403	acuminatum, Brong.	,,	56 6
Lobbianus, Turoz	•••	,,	401		,,	564
longifolius, Wall	•••	"	409	approximatum, Wedd.	,,	568
lucidus, Roxb	•••	"	403		,,	561
Monocera, Cav		,,	405	oilintum, Clarke	,,	574
monocoroides, Wight	•••	"	409		,,	569
montanus, Thw	•••	"	404		r. 5 60	0, 574
Munroii, Mast	•••	"	407		▼	
nitidus, Jacq		"	401	cuspidatum, Wight	v. 56	4, 565
oblongus, Gærtn	•••	, ,,	403		▼	
oblongus, Wall	i.		402		,,	570
obovatus, Arn	•••	í.	404		,,	568
ovalifolius, Wall	•••	"	402		,,	572
paniculatus, Wall	•••	**	407		11	
parvifolius, Wall	•••	**	401		, ,,	563
pedunculatus, Wall.	•••	"	408		··· ′ ,,	
Perim-Kara, DC	•••	**	403		11	560
Pirincara, Wall	•••	,,	401	Griffithii, Hk. f	,,	569
polystachyus, Wall.	•••	"	403		••• •	
prunifolius, Wall	•••	"	407		,,	
pubescens, Hook	•••	"	404	7	,,	572
punctatus, Wall	•••	"	105		,,	575 565
robustus, Roxb	•••	,,	102	lineolatum, Wight	,,	KQA
? robustus, Wall	•••	"	408		11	568
rugosus, Roxb	•••	**	405 405		,,	566
rugosus, Wall	•••	37	401	10 - 11 - 11 - 11 - 14	,,	564
serratus, Linn	•••	**	408		11	564
serratus, Heyne	• ·	1)	401		,,	£71
serratus, Roxb serratus, Wall	•••	"	402	/ / / / / / / / / / / / / / / / / / /	••• 11	571
7 / TD 1	•••	**	405	37	,,	574
11 1 1	•••	"	402	- N. A		578
	•••	"	404	14 12 11 Dal-	,,	559
subvillosus, Arn	•••	"	404	3872 1. 4	,,	559
tuberculatus, Roxb.	•••	"	404		,,	. 200
Varunua, Ham	•••	"	407	"1 ". 1 -11 TIT. 2.2	,,	566
? venustus, Bedd	•••	"	405	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	,,	564
Eleodendron, Jacq. f.	•••	ï.	623		,,	570
glanoum, Pers		"	623	t	,,	EGO
nilghirense, Wall	•••	"	614	pusillum, Clarke	,,	KAQ
ozyodon, Turez	•••	"	623	reptans, Hk. f	,,	5.07
paniculatum, W. & A.	•••	"	623	rupestre, Wedd	,,	564
Rosburghii, W. & A.	•••	"	62 3		,,	<i>5</i> 68
Elmosticta, Fenel	•••	íi.	673	:#-1: 171.	,,	564
meifolia, Fenzl	•••	92	678		,,	563
Elate sylvestris, Linn.	•••	₹i.	425	sikkimense, Clarks	,,	571

Elatostema	7	ol.	Page	Eleocharis	Vol.	Page
stellatum, Hk . f	•••	₹.	572		. vi.	
Stracheyanum, Wedd.	• • •	,,	567		. ,,	630
subincisum, Wedd	•••	"	566		,,	630
${f surculosum}, {m Wight} \dots$	•••	,,	572		,,	629
	•••	"	571		,,	625
	•••	"	566		,,	628
	• • •	,,	568	1	. ,,	626
Wightianum, Wedd.	•••	"	575		,,	626
Wightli, Hk. f	• • •	,,	570		,,	630
	•••	".	564	sp., Hk. f. & T		630
	•••	vii.		sp., Wall vi. 626, 62		
	•••	."	336	Eleogenus, Noos		
	•••	ii.	158		,,	627
	•••	"	153		. ,,	628
	•••	"	174		:	628
	•••	"	158		Vi.	65 3
	•••	₹ī.	625		,,	634
	•••	"	628		. ,,	631
	•••	"	627		;;	
	•••	"	629		111	242
	•••	"	630		:	
	•••	"	627		Vi.	240
	•••	"	627 6 2 9	1 0 1 1/1/1	,,	251
	•••	"	627		. ,,	235
•	•••	"	628	4 17 7 mt	,,	233
capitata, Boeck	•••	"	629	l '	. ,,	233
Unablaria, n. g b	• • •	"	629	l 21 16 1. G-11.	. ,,	235
	•••	"	629	a	,,	251
	•••	"	654		,,	235
	•••	"	630	7 1 (77)	. ,,	233
	•••	"	626		,,	242
	;··	"	630		vi.	251
	•••	"	626	A PLAT TO A COMME	,,	252
	•••	"	629	Daller	. ,,	251
0-1-14		"	656	D	. ,,	252
		"	626	701	. vii	293
	•••	"	656	lti Deet	. ,,	295
· · · · · · ·	•••	"	630		. ,,	294
· · · · · · · · · · · · · · · · · · ·	•••	,,	627	- Janata 701 manik	. ,,	29 6
	•••	"	626	1 12 - D.	. ,,	294
	•••	"	629	calycina, Ham	. "	306
		"	628	calycina, Roxb	. ,,	297
	•••	"	62 8	cerealis, Salisb	. ,,	294
		"	680	chinensis, Duthie	. ,,	298
		"	628		. ,,	295
D	•••	"	62 8	coracana, Gærtn	. ,,	294
	•••	"	630		. ,,	295
		,,	627		. ,,	299
plantagines, Br	•••	"	625		. ,,	298
plantaginea, Boeck.	•••	,,	626	distans, Moench	. ,,	294
emrnurascens, Boeck	•••	,,	630	domingensis, Sieb	. ,,	294
setacea, Br	•••	"	629	dura, Lamk	. ,,	885
	•••	,,	627	? filiformis, Pers	. ,,	298
	•••	"	629	flagellifera, Ness	•••	294
subprolifera, Staud	••	,,	629	glaucophylla, Munro	•••	296
subulata, Bosck	•••	"	6 26	Gouini, Fourn	. 11	294

Eleusine		Val.	Dago	Elsholtzia		Wal	Page
		••	Page 294	Hoffmeisteri, Klotz		iv.	645
2 2 122 124 1			299	2			644
	•• •••		294	leptostachya, Benth.	•••	**	646
3 31 (1			293		•••	"	610
	•• •••		294		•••	"	642
monostachya, Spreng	• • • • • • • • • • • • • • • • • • • •		293		•••	**	631
		•••	2 95	paniculata, Willd pilosa, Benth	•••	11	644
mucronata, Stokes .			295		<u></u>	612	646
oligostachya, Wight.			295	polystachya, Benth.			645
pectinata, Moench		"	293	pusilla, Benth		,i⊽.	645
penicillata, Spreng.	•••	**		strobilifera, Benth	•••	"	643
		"	295	Thompsoni, Hk. f	•••	**	632
	•• •••	"	295	? villosa, Roxb	_;;	979	
	•• •••	"	296	Elymus, Linn			421
rigidifolia, Fourn		"	294	Caput Medusæ, Forsk.	•••	vii.	90
scabra, Fourn		"	294	dahuricus, Turcz	•••	27	374
scindica, Duthie		"	296	dasystachys, Trin	•••	"	374
sphærosperma, Stoke		,,	294	glaucus, Buckl	•••	"	873
P stolonifera, Br	• •••	**	294	jenisseensis, Turoz	•••	93	374
stricta, Roxb	• •••	"	294	nutans, Griseb	•••	**	378
Tocussa, Fresen	• •••	87	294	sibirious, Linn	•••	11	373
tristachya, Lamk		**	294	tener, Linn. f	•••	77	378
verticillata, Roxb	• •••	"	295	P Thomsoni, Hk. f	•••	"	874
Wallichii, Munro		"	295	Elyna, Schrad	•••	₹i.	696
Elichrysum, vide Hele	ich r y-			capillifolia, Dene	•••	**	697
		iii.	280	capillifolia, Hend	•••	,,	701
Elionurus, Humb. & 1		vii.	161	filifolia, Turez	•••	` 11	699
Grisebachii, Schm		,,	161	kokanica, Regel	••••	,,,	698
hirsutus, Munro		**	162	Plava, Kunth	•••	"	698
pertusus, Nees		,,	173	schænoides, C. A. Mey.	•••	"	697
Royleanus, Nees		,,	161	sibirica, Turoz	•••	,,	697
Elkania multinervis, So	hl	₹.	582	spicata, Boiss	•••	"	697
Psp., Hohen		. **	585	stenocarpa, Kar. & Kir.	•••	11	698
Ellertonia, Wight		iii.	64 1	sp., Hk. f. & T. vi. 695,	696,	697,	699
Rheedii, Wight		,,	641	Elytranthe albida, Bl	•••	▼.	222
Ellipanthus, Hk. f		ii.	55	farinosa, G. Don	•••	11	216
calophyllus, Kurs		,,	55	formosa, G. Don			220
Griffithii, Hk. f		**	56	retusa, G. Don	•••	"	219
Helferi, Hk. f		,,	55	sphærocarpus (sphæroide	ea),		
Thwaitesii, Hk. f		,,	55	G. Don	•••	"	22 1
tomentosus, Kurs		11	56	Elytraria, Vahl	•••	i▼.	394
tomentosus, Hk. f		••	54	crenata, Vahl	•••	"	894
Ellipsia, Hk. f. & T		i.	52	indica, Pers		**	394
cuncifolia, Hk. f. & 7	r	,,	52	lyrata, Vahl	•••	"	394
ferruginea, Hk f. &	T	"	52	marginata, Beauv	:	"	394
glabra, Hk. f. & T		"	52	Vahliana, Michx	•••		394
nervosa, Hk. f. & T.	•••	,,	52	virgata, Vahl	•••	"	394
Elodea formosa, Jack		í.	258	Elytrophorus, Beauv		vii.	806
sp., Griff		"	257	articulatus, Beauv			306
Elsholtzia, Willd		iv.	642	Embamma cordigera, Griff.		i.	664
Beddomei, Clarke		"	648	heterantha, Griff	•••		664
blanda, Benth		643,		Embelia, Burm		iii.	512
oristata, Willd		iv.	645	adnata, Bedd	•••		514
densa, Benth		,,	645	amentacea, Clarke	•••	"	514
eriostachya, Benth			645	? Basaal, A. DC		"	515
eriostachya, Hk. f.		"	645	canescens, Jack			514
flava, Benth		"	642	coriacea, A. DC		"	513
A 1 4 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		"	644	coriacea, Wall	•••	"	514
Griffithii, Hk. f	• • • • • • • • • • • • • • • • • • • •	"	(***	"	

Embelia Vol. Page	Vol. Page
esculenta, D. Don iii. 515	Empusa paradoxa, Lindl v. 698
ferruginea, Wall ,, 515	paradoxa, Wall ,, 696
floribunds, Wall ,, 514	Empusaria sp., Rohb f v. 698
Gamblei, Kurz 516	Enchidium verticillatum, Jack v. 398
garciniafolia, Wall iii. 513, 514	Endiandra, Br v. 126
Gardneriana, Wight iii. 517	? Candolleana, Meiser , 125
glandulifera, Wight , 513	firma, Nees ,, 126
Grossularia, Retz ,, 619	Maingayi, Hk. f ,, 127
Lampani (Limpani), Scheff. ,, 514	Endopogon Amomum, Nees iv. 435
? lucids, Wall ,, 517	argutus, Nees ,, 432
macrophylla, Scheff ,, 513	capitatus, Wight ,, 433
microcalyx, Kurz ,, 518	consanguineus, Noes iv. 432, 435
Myrtillus, Kurz ,, 516	cuspidatus, Benth iv. 435
Nagushia, D. Don ,, 516	decurrens, Nees iv. 436, 440
nutans, Wall ,, 517	digitalis, Nees iv. 432
oblongata, Miq ,, 513	foliosus, Wight ,, 433
parviflora, Wall ,, 515	Gardnerianus, Noos, 446
picta, A. DC ,, 515	hypoleucus, Nees iv. 432, 436
Preticulata, Wall ,, 515	integrifolius, Dalz iv. 458
Ribes, Burm ,, 513	khassyanus, Nees ,, 436
robusta, Roxb ,, 515	macrostegius, Nees ,, 456
sessiliflora, Kurz ,, 513	rhamnifolius, Wight ,, 433
? Tsjeriam-Cottam, A. DC. " 515	Strobilanthes, Wight ,, 439
umbellulata, Wall ,, 512	versicolor, Wight ,, 435
urophylla, Wall ii. 812	viscosus, Nees ,, 431
vestita, Rozb iii. 517	vitellinus, Nees ,, 512
vestita, Kurz ,, 517	Endospermum, Benth v. 458
villosa, Wall iii. 514, 515	chinense, ? Benth ,, 458
viridiflora, Scheff iii. 516	malaccouse, Muell ,, 458
sp., Bedd , 514	perakense, King ,, 458
sp., Griff , 517	Endotropis auriculata, Done. iv. 25
Emblica officinalis, Gartn. v. 289	caudata, Miq ,, 25
Palasis, Ham ,, 275	Jacquemontii, Done ,, 26
racemosa, Spreng ,, 285	Roylei, Done ,, 26
Embryogonia arborca, Teysm.	Engelhardtia, Leschen v 595
& Binn ii. 446	acerifolia, Bl , 596
lucida, Bl ,, 454	chrysolepis, Hance " 596
Embryopteris gelatinifera, G.	Colebrookiana, Lindl , 596
Don iii. 55 ^R	nudiflors, Hk. f , 597
glutenisera, Roxb ,, 556	palembanica, Miq " 596
Kaki, G. Don ,, 555	rigida, Bl " 597
lanceolata, G. Don ,, 556	Rosburghiana, Lindl ,, 595
peregrina, Gærtn ,, 556	serrata, Bl ,, 596
Emericia Pergularia, R. & S. iii. 651	spicata, Bl ,, 595
Emilia, Cass iii. 335	villosa, Kurz ,, 596
angustifolia, DC ,, 336	Wallichiana, Lindl ,, 596
flammea, Cuss ,, 336	Enhalus, &ich v. 663
mucronata, Wall , 336	acoroides, Zoll ,, 663
prenanthoidea, DC , 336	Koenigii, Rich ,, 663
prenanthoidea, Thw. iii. 336, 337	marinus, Griff ,, 663
sagittata, DC iii. 336	sp., Griff ,, 663
scabra, DC ,, 336	Enhydra, Lour iii. 304
sonchifolia, DC ,, 336	fluctuans, Lour ,, 304
Walkeri, Hk. f ,, 337	Heloncha, DC ,, 304
zeylanics, Clarke ,, 336	Enicostems, Bl iv. 100
Emmenospermum, Clarke iv. 304,	littorale, Bl ,, 101
305, 734	Enkianthus, Lour iii. 461
000, 101	

Enkianthus	Vol. I	Page		Vol.	Page
himalaicus, Hk. f. & T.	iii.	461	Epidendrum aloides, Curt		•
Enkleia malaccensis, Griff.	v.	198	(aloifolium),	vi.	11
Enkylia digyna, Griff	ii.	633	aloifolium, Linn	. ,,	10
	,,	633	bidentatum, Koen		197
Enneapogon dipsaceus, Wa	ill. vii.	301	calceolare, Ham		60
	,,	301	1 1 . 15	. ,,	197
	ii.	286	calceolaria terrestre, Kon		197
	,,	287	clavatum, Koen		197
D	,,	287	claratum, Retz		66
7	,,	287	complanatum, Kœn		197
D1 1	,,,	287	complanatum, Retz		41
Rumphii, Scheff	,,	287		. ₹.	748
7 77 11	,,	287	ensifolium, Linn	. vi.	14
	vii.	284	Flabellum Veneris, Koen	١. ,,	197
11 11 11	,,	284		,,	197
	ii.	311	731 T	. ,,	28
Euphylon Lobbii, A. Gray		95		,,	45
EPACRIDEAL		477	hezandrum, Koen		198
Englies, Cass.	iii.	274	Hippium, Ham	vi.	32
divaricata, Cass linearifolia. DC		274	Hippium, Ham humile, Sm	. v.	841
linearifolia. DC	iii. 248.	274	liliifolium (liliiflorum), Ka	en. Vı.	198
pygmæa, DC	iii.	274	1	., ,,	198
Ephebopogon gratus, Nees	vii	116		•• ,,	198
Ephedra, Linn			1, , , , , , , , , , , , , , , , , ,	v.	
alata, Edgew				,,	685
	v. 041,		1 12	vi.	
asparagoides, Griff	▼.		7 7 72	٠, ٠,	198
ciliata, Fisch. & Mey.		641	7 7 7 7 77	•••	198
distachya, Linn	- 640	RRI	plantaginifolium, Kon.	•••	198
foliate Roice	v. 641	863	1 - 101		840
foliata, Boiss foliata, Aitch	V. UTL,	863		vi.	68
Corordiana Wall	# 640	863) .,, ,,		198
Gerardiana, Wall			D	,,	37
glauca, Regel	··· •	863		!!	688
intermedia, Schr. & M	ey. ,,	640			
macrocephala, Bert. monostachya, Linn	,,	640	, , , , , , , , , , , , , , , , , , , ,		197
monostacnya, Lini	••• ,,	961	1	"	18
nebrodensis, Tineo pachyoluda, Boiss	- 611	663		53, vi	
paonyolada, Doiss	V. U11,	969	spathulatum, Kon		
peduncularis, Boiss.					50
	v.	040	spathulatum, Linu , subulatum, Kœu		198
Ephippiorhynchium triflor		670	1	• • •	44
Nees		670	1 0 1 17	,,	198
Epicarpurus asper, Staud				,,	
orientalis, Bl		489		,,	25
spinosus, Wight		488		,,	
timorensis, Done	,,	488	tomentosum, Kœn. ▼. 8		
zeylanicus, Thw	,,	488	triste, Forst		
sp., Hk. f. & T	,	487		,,	66
Epicharis exarillata, Ann.		546		"	198
exarillata, Nimmo		561	sp., Griff	▼.	. 842
mollis, Wall		548	Epigynium acuminatum,		
sp., Kurs	,,	552		iii	
Epichysianthus macrophyl	lus,		affine, Klotz		458
Voigt	iii.	661		,,	458
Epicranthes barbata, Roh	b. f. v.	781		,,	458
javanica, Bl	,,	753	Griffithianum, Klotz.	,,	45
EPIDENDREA V.	36 7, 669	675	Leschenaultii, Klotz.	,,	45

Epigynium	37 61	Dama I	Cyanotis	▼ol.	Page
malaccense, Klotz	Vol.	454	· · · · · · · · · · · · · · · · · · ·	vi.	119
		155	1-410-11- C		125
1 4 771	"	447	7		125
**************************************	"	452		,,	126
	"	453		99	119
Sprengelii, Klotz	"	452	D	,,	126
venosum, Klotz	.,,,	665		,,	126
Epigynum, Wight	iii.			;	128
Griffithianum, Wight	"	666		vi.	122
Plævigatum, Hk. f	"	666		,,	124
Maingayi, $Hk. f.$	**	666		VI.	
? parviflorum, Hk. f	. ??	666		,,	124
Epilasia, Bunge	iii.	419		,,	124
ammophila, Bunge	"	419		,,	124
Bungei, Clarke	22	419	roseum, Lindl	,,	124
Epilobium, Linn	ii.	582		vi.	548
alpinum, Linn	"	586		,,	546
anagallid folium, Lauk	,,	585	giganteum, Schott	,,	548
angustifolium, Linn	,,	582	$\qquad \qquad humile, \textit{Hk}.\textit{f}. \dots \dots$,,	549
brevifolium, D. Don	"	586		,,	540
cylindricum, D. Don	"	585	mirabile, Schott	,,	549
fruticosum, Lour	"	587		., ▼.	463
Gerardianum, Wall	"	593		,,	464
hirsutum, Linn	"	583	17 / L / 101	., i.	207
Hookeri, Clarke (s. e	••		Epistylium cordifolium, Bai		800
Errata)	"	585		v. 303,	304
khasianum, Clarke	,,	585	-l	v .	802
latum, Wall	"	584	7 - 4 / C . 7 /	. ,	800
latifolium, Linn	"	583	monday naves There		308
laxum, Royle	"	587	mladianská da Dažii	••	302
origanifolium, Lamk	"	586		••	802
palustre, Linn	"	585	mulahmum Daill		302
parviflorum, Schreb	"	584	Dankamakii Daill	• • • • • • • • • • • • • • • • • • • •	300
reticulatum, Clarke	"	583	manifemater Dail	••	302
roseum, Schreb	"	584	77-141 D1	iv.	369
sericeum, Benth	"	584	**************************************		369
serratum, Jacquem	"	583 ·		,	369
eveciosum, Done	"	583	10 / - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	•• ,	369
picatum, Lamk	"	583			369
tetragonum, Linn	"	586	2 cm Wall		369
tomentosum, Vent	"	584	Epithinia malayana, Jack		125
trichoneurum, Hausk. (see			sp., Griff		125
vestitum, Benth	ii.	584	77	vii.	295
	585,		17		812
Epimedium, Linn	i.	112		ii. 3 25	
elatum, Morr. & Done	,,	112	" 1 110. TEE A. A		317
Epipactis, Br	٧ï.	125	amabilis, Willd		324
? americana, Lindl	"	126		,,	315
amæna, Ham	"	126		,,	314
? bicarinata, Ham		6	manananan Washa	,,	324
carinata, Roxb	"	121	mana animana Tamana	,,	322
consimilis, Wall	**	126	Gunes Stored	,,	313
consimilis, D. Don	"	125	Latinata Trans	,,	319
Dalhousiæ, Wight	"	125	1 1 - 1 - 1 - 4 - 1 O4 A	,,	319
gigantea, Dougl		126	hifamia Wight	,,	325
graminifolia, Roxb	, ", V.	814	1 2.25	,,	326 326
herbacea, Lindl		125		i. 3 26,	
intrusa, Lindl		126		vii.	
,	"		E som compl	VAI.	021

Eragrostis	Vol. 1	Do es	Eragrostis	w.	ol. Page
	, v ii.		orientalis, Trin	▼	
Browneana, Nees		319	ovina, Nees		, 318
	. 318,		paniculata, Steud		, 314
caudata, Nees	•••		paniculata, Thw		324
cernua, Steud		327	papposa, Steud		.822
ciliaris, Link	•••	314	parviflora, Trin		328
ciliaris, Boiss	•••	314	parviglumis, Hochst.	,	999
ciliaris, Pluk		26	pellucida, Steud	•	, 82 3
ciliaris, Trin	• • • • • • • • • • • • • • • • • • • •	315	phleoides, Stapf	•	, 313
oiliata, Nees		313	pilosa, Beauv		323
coarctata, Stapf	•••	813	plumosa, Boiss		, 314
Collettii, Stapf		326	plumosa, Link		, 315
collocarpa, K. Schum	•••	822	plumosa, Thw		, 815
confinis, Nees		327	poæformis, Liuk		321
coromandelina, Trin	•••	326	pozoides, Beauv		, 32 L
cretacea, Nees		326	poæoides, Trim		, 322
Cumingii, Steud	• • • • • • • • • • • • • • • • • • • •	319	poæoides, Trin		, 320
cylindrica, Aitch		313	polymorpha, R. & S.		, 322
cynosuroides, Beauv		324	polymorpha, Trin		,, 317
despiciens, Schult		315	procera, Steud		,, 829
diandra, Aitch		316	pubescens, Steud		,, 319
diarrhena. Steud		316	pulchella, Parl		,, 314
diplachnoides, Steud		316	punctata, Link		,, 323
elegantula, Steud		318	rhachitricha, Hochst.		,, 820
elegantula, Nees vii. 31		828	rigidifolia, Hochst		,, 323
elongata, Jacq		319	riparia, Nees		" 315
ferrugines, Beauv		824	riparia, Steud		" 315
flexuosa, Steud	•••	32 0	Rothii, Steud		" 316
annantin Ottomi	. ,,	318	Rottleri, Stapf		" 321
hapalantha, Trin		316	rubens, Hochst		" 317
Hochstetteri, Steud.	. ,,	316	rupestris, Steud		" 313
indica, Stend		323	secunda, Nees	•••	" 826
interrupta, Beauv		316	spe rostachya, Coss. &	Dur.	" 32 3
interrupta, Steud		319	stenophylla, Hochst.		,, 318
japonica, Trin	,,	316	stricta, Stend		,, 816
Koenigii, Link	. ,,	316	tenella, R. & S		,, 315
laza, Baker	"	315	tenella, Benth	•••	" 31 6
leioptera, Stapf	,,	325	tenella, Nees		,, 314
lepida, Hoohst	,,	314	tenella, R. & S		,, 315
lobata, Trin	,,	314	tenellula, Steud		,, 817
luzoniensis, Steud	,,	318	tenuifolia, Hochet		,, 322
	,,	320	tenuissima, Schrad	•••	,, 317
	,,	317	terebinthacea, Kurs	•••	,, 316
	,,	316	thraulostachys, K. Sci	ıum.	,, 825
	,,	820	tremula, Hochst	•••	,, 320
	,,	321	unioloides, Nees		,, 317
	,,	316	verticillata, Coss		" 323 316
	,,	316	verticillata, Nees		" 9,0
? mucronata, R. & S.	,,	322	verticillata, R. & S		" 32 8 " 31 6
mucronata, Trim	,,	328	? viscosa, Dalz. &. Gib		" 918
	,,	320 320	viscosa, Trin		321
	,,		viscosa, Wight		,,
	,,	526	Wightigma Bonth		320, 323 vi., 327
	,,	324 316	Wightiana, Benth		200
	,,	316	Willdenoviana, Nees Willdenoviana, Nees	•••	" 910
	,,	319	? Willdenovii, Steud.		″ 210
orientalis, Nees	,,	OTO	i i i i i i i i i i i i i i i i i i i	•••	,, 310

Eragrostis Vol. Page	Eremochloa Vol. Page
zeylanica, Nees & Moy vii. 319	
	77-16: M 141
sp., Benth ,, 328 sp., Wall. vii. 313, 314, 315, 316,	
317, 318, 319, 320, 322, 323, 324, 329	10010101011 111 111 111
	140
	200
	, , , , , , , , , , , , , , , , , , , ,
	laciniata, Aitch ,, 695
	superba, Royle ,, 695
barlerioides, Roxb iv. 416, 420	Vicaryi, Benth ,, 695
bifarium, Nees iv. 500	Eremurus, Bieb vi. 832
Blumei, Toysm.? ,, 499 capense, Linn ,, 421	himalaicus, Baker ,, 332
capense, Linn ,, 421	persious, Boiss ,, 333
cinnabarinum, Wall ,, 499	Eria, Lindl v. 785
orenulatum, Lindl ,, 497	acervata, Lindl ,, 796
crenulatum, Nees , 598	acutifolia, Lindl ,, 800
crenulatum, Wall iv. 497, 498	aeidostachya, Rchh.f ,, 809
diantherum, Roxb iv. 497	affinis, Griff ,, 797
Ecbolium, T. Anders ,, 544	alba, Lindl " 795
Edgeworthianum, Nees ,, 418	1 amica. <i>Acro.</i> 1
elatum, Kurz ,, 498	andamanica, Hk. f. v. 801, vi. 190 Andersonii, Hk. f. v. 795, vi. 190
elegans, Masters ,, 499	
fastigiatum, Spreng ,, 421	Ania, Rehb. f v. 820
graciliflorum, Nees ,, 500	annulata, Lindl ,, 808
indicum, Clarke ,, 497	anthomeniaca, Robb. f ,, 798
latifolium, Kurz ,, 498	aporina, Hk. f v. 803, vi. 191
leptanthus, Clarke ,, 500	articulata, Lindl v. 788
macrophyllum, Wall ,, 419	bambusifolia, Lindl ,, 805
malabaricum, Clarke ,, 497	barbata, Rchb. f ,, 803
malaccense, Clarke ,, 498	bicolor, Lindl v. 793, 799
montanum, Hook ,, 496	bicornis, Rehb. f v. 821
montanum, Roxb ,, 421 montanum, Wall ,, 420.	hiflora, <i>Griff</i> ,, 800
montanum, Wall ,, 420	bistora, Lindl ,, 806
nervosum, Br ,, 418	bipunctata, Lindl ,, 792
nervosum, Dalz. & Gibs ,, 421	braccata, Lindl ,, 787
palatiferum, Nees ,, 498	braccala, Dalz. & Gibs ,, 787
palatiferum, Hk. f iv. 498, 499	bractescens, Lindl ,, 796
Parishii, Clarke iv. 499	calamifolia, $Hk. f.$ vi. 191
pubercens, Roth ,, 500	carinata, Gibs v. 803
pulchellum, Andr ,, 418	clavicaulis, Wall ,, 799
pulchellum, Roxb ,, 420	clavicaulis,? Lindl ,, 805
punctatum, Nees ,, 499	concolor, Par. & Rehb. f. ,, 798
purpurascens, Nees ,, 420	confusa, Hk f ,, 796
racemosum, Roxb ,, 497	convallarioides, Lindl ,, 791
roseum, Br ,, 419	coronaria, Rehb. f ,, 828
salaccense, Bl ,, 420	crassicaulis, Hk. fv. 805, vi. 191
semperflorens, Roth ,, 497	cylindripoda, Griff. (lapsu
strictum, Coleb ,, 419	Trichosma) v. 827
succisifolium, Kurz ,, 499	Dalzellii, Lindh ,, 789
suffruticosum, Roxb ,, 420	dasyphylls, Par. & Rehb. f. ,, 808
tetragonum, Wall ,, 420	dasypus, Rehb. f ,, 802
Wightianum, Wall ,, 421	Dayana, Rchb. f ,, 802
sp., Griff , 418 sp., Hk. f. & T iv. 418, 421	discolor. Lindl v. 802, vi. 190
	elata, Hk. f v. 794
Erebennus canaranus, Alef i. 341 Eremochlos, Büse vii. 140	elongata, Lindl ,, 801
	Elwesii, Rohb. f ,, 786
bimaculata, Hack ,, 140	ephemera, Rohb. f ,, 799

Eria Vol. Page	Eria Vol. Page
eriopsidobulbon, Par. S	Pleurothallis, Par. 3 Rchb.f. v. 804
Rehb. f v. 796	polystachya, A. Rich ,, 792
excavata, Lindl v. 795, 796	polyura, Lindl ,, 809
exilis, Hk. f v. 788, vi. 190	pubescens, Wight , 793
extinctoria, Oliv v. 788	pubescens, Lindl ,, 801
ferox, Bl ,, 806	pulchella, Lindl. v. 801, vi. 190
ferrugines, Lindl ,, 804	pulchella, Griff v. 797
filiformis, Rchb. f " 789	pulvinata, Lindl , 807
flava, Lindl ,, 801	pumila, Lindl ,, 791
flava, Griff ,, 801	pusilla, Lindl ,, 787
flava, Wall ,, 803	pygmaa, Hk. f. v. 804, vi. 191
floribunda, Lindl " 792	ramosissima, Wall v. 826
Fordii, Rolfe ,, 808	recurvata, I/k . f. v. 797, vi. 190
fragrans, Rchb. f " 794	reticosa, Wight v. 787
gracilis, Hk. f v. 806, vi. 191	reticulata, Benth ,, 786
graminifolia, Lindl v. 794	Rimanni, Rchb. f , 809
Griffithii, Rehb. f ,, 797	ringens, Rchb. f ,, 793
hologlossa, Par. & Rehb. f. " 822	rosca, Lindl ,, 808
iridifolia, IIk. f v. 790, vi. 190	rufinula, Rchb. f ,, 807
Jerdoniana, Rohb. f v. 787	saccifera. Hk. f. v. 797, vi. 190
khasiana, Lindl ,, 799	scabrilinguis, Lindl v. 792
Kingii, IIk. f v. 790, vi. 190	Scortechinii, Hk. f. v. 809, vi. 191
Kurzii, T. Anders v. 797	secundiflora, Griff v. 791
lanata, Griff " 801	sicaria, Lindl, 802
lancifolia, Hk. f v. 804, vi. 191	speciosa, Rehb. f ,, 822
laniceps, Rohb. f v. 801	sphærochila, Lindl, 795
leiophylla, Lindl " 809	stricta, Lindl , 791
leptocarpa, IIk. f v. 805, vi. 191	suavis, Lindl ,, 827
Lichenora, Lindl v. 787	teretifolia, Griff ,, 804
Lindleyana, Griff ,, 794	Thwaitesii, Trim vi. 191
Lindleyi, Thw ,, 799	Thwaitesii, Hk. f v. 803
longifolia, $Hk. f.$ v. 790, vi. 190	tomentosa, $IIk.f.$, 803
Maingayi, $Hk. f.$ v. 798, vi. 190	tomentosa, Lindl vi. 198
marginata, Rolfe v. 800	tricolor, Thw v. 798
Meirax, $N. E. Br. \dots , 786$	truncata, Lindl ,, 799
merguensie, Lindl " 791	tubeross, Hk. f. v. 807, vi. 191
microchilos, Lindl " 789	uniflora, Dalz v. 787
monticola, $Hk.f.$, 806	ustulate, Par. & Rehb. f. ,, 787
muscicols, Lindlv. 789, vi. 190	velutina, G. Lodd ,, 807
Myosurus, Hk. f v. 810	velutina, Thw ,, 803
myristiciformis, Hk. f , 797	vestita, Lindl , 806
mysorensis, Lindl ,, 793	vittata, Lindl ,, 794
nana, A. Rich ,, 789	Wightii, Robb. f , 821
nutans, Lindl , 800	Eriachne, Br vii. 269
obesa, $Lindl.$,, 793 obliqua, $Lindl.$,, 790	chinensis, Hance ,, 269
obliqua, Lindl ,, 790	Hookeri, Munro ,, 269
oligantha, Hk. f v. 807, vi. 191 ornata, Lindl v. 803	
, , , , , , , , , , , , , , , , , , , ,	1 . 1 . / 1 D == 45 050
	11:6-1: N
700	Eriantho affine, Wall vii. 129 Erianthus, Michw vii. 121
.112 D.11.6 909	
700 P. D. L. 700	
planicaulis, Wall ,, 824	Cumingii, F. Muell , 112
Leminorania itali ii))	, , 144

Trianshar '		Erigeron	W-1	D
	l. Page i. 122		• • •	Page 260
	105	1. 11/2/2/2/2 D 41	•	256
fastigiatus, Nees ,	123		• , "	254
filifolius, Nees		full and the Dan	. ,,	270
fulvus, Nees vii. 1	100		. ,,	292
Grimton, Hk. J vi	1. 126	1 · ·	• . "	
herastachyus, Hochst,			. ,,	263
Hookeri, Hack ,	, 123	hirsutus, Wall		254
jamaicensis, Anderse ,		hispidus, DC	. ,,	251
japonicus, Str. & Wint ,	, 123		,,	256
longisetosus, Anderss ,	, 124		. ,,	270
mishmeensis, Munro,		linifolius, Willd	. ,,	254
mollis, Griseb ,	, 111	mollis, D. Don	. ,.	26 L
nudipes, Griseb	, 107	monticolus, DC	. ,,	255
pallens, Hack ,	194	multicaulis, Wall	. ,,	255
purpurascens, Anderss ,	199	multiradiatus, Benth		256
Ravennee, Beauv ,,	191	obliquus, Linn		26 0
Koxburghii, F. Muell ,	110	pinnatifidus, D. Don	. ,,	259
rufipilus, Griseb ,,	192	10 11 10	. ,,	257
rufus, Nees ,	110	5 D. J. DO	. ,,	255
sikkimensis, Hk. f ,	100	semibarbatus, DC		255
speciosus, Debeaux	113		-	254
tristachyus, Nees vii. 11		Andreadance To Dom		259
versicolor, Nees vii				299
and Industry Mana	106			256
vulpinus, Nees ,	110	Erimatalia Rheedii, R. & S		
sp., Hk. f. & T				394
sp., Wall vii. 107, 12	3, 164	Erinocarpus, Nimmo		
ERICACEA ii		Nimmounus, Grah	• • •	394
Ericala aquatica, G. Don iv			. 17.	264
argentea, G. Don ,,		Eriobotrya, Lindl		870
capitata, D. Don ,,		angustissima, Hk. f.		372
carinata, D. Dort ,,			. ,,	371
coronata, D. Don ,			., ,,	371
decemfida, D. Don ,,			,,	371
depressa, D. Don ,,		elliptica, Lindl	. ,,	372
humilis, G. Don ,,	111	elliptica, Hk. f. & T.	. ,,	370
marginata, D. Don ,,	113	Hookerians, Done	. ,,	371
orbiculata, G. Don ,,	111		,,	380
pedicellata, D. Don ,	111	ig japonica, $Lindl$		372
procumbens, G. Don ,.	111	latifolia, Hk. f	. ,,	370
quadrifaria, G. Don,	111	longifolia, Hk . f		870
Royleana, G. Don ,	110	macrocarpa, Kurz	,,	372
squarrosa, G. Don	111	petiolata, $Hk.f.$		870
tubiftora, G. Don ,,	110	Eriobotryæ vel Photiniæ		
venusta, G. Don ,,	118	affinis, Miq	. iii.	582
Ericinea, Griff iii		ERIOCAULER	. vi.	571
Ericoila aquatica, Borkh. iv		Eriocaulon, Linn :.		571
verticillata, Borkh ,,	101	achiton, Kærn		584
Erigeron, Linn iii	. 254	alpestre, Hk . f . F . F		578
acris, Clarke ,,	0:2	argenteum, Mart	•••	582
	OE4		••	582
alatum I) Don	971	a ama a mun Parmu	••	574
	OEE	1. D		580
and and laides Dough	955	bifistulosum, Heurck	. ,,	572
an acceptantures Tindl	OEC			572
	050			575
and and share Maril	054	70		576
and madden Damb	970	Capillus-naiadis, Hk. f	• ,,	572
asteroides. Koxb ,,	, 2,0	Oskaras manaras 116. J	,,	

Eriocaulon	₩.1	T)	Eriocaulon	97.1	9
caulescens, Hk. f. & T	voi. ▼i.	Page 572	l . 		Page 572
. 1. 1. 7		585	l		580
	"	578	l , , ,,,,	"	576
	"	578		•••	577
C 11 TTT 4	71	575		•••	580
11! 111. P	"	584	Sieboldisnum, Sieb. & Zucc		577
	"	574	07-1-137		578
and date on Dankle	"	574			583
	**	575	1] - 1		579
	"	581			578
	"	580	and admin to the bear		598
D	"	578	l , +++ -	•••	577
	"	679	(fil)		583
., , , , , , , , , , , , , , , , , , ,	"	582			588
	"	585	A		578
a m	."	585	viride, Korn	• • •	581
	27	577	W7-11: 111. c		588
	"	581		578,	
77 17	"	579		• •	576
	"	583	wightianum, Mart weranthemoides, Hourck &		010
Helteri, Hk. f heterolepis, Steud	"	585	M 11		584
	,,	577	11 16	, ,,	584
	"	577	Eriochæta densiflora, Fig. &		002
	**	572			87
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	"	578			87
kiusianum, Maxim	"	577	secundiflora, Fig. & Not.	17	87
lanceolatum, Miq	"	574	Eriochlos. H. B. K	.".	20
leucomelas, Steud	"	573		¥ii.	20.
longiouspis, Hk. f	"	580			20
longifolium, Nees	"	582	TT		20
luzulæfolium, Mart	"	584			20
lusulæfolium, Thw	"	582	succincta, Kunth		20
Martianum, Wall	"	574	sundaica, Miq		120
melaleuoum, Mart	"	585	Eriochrysis attenuata, Nees		120
minimum, Lam	**	579	fusca, Nees fusca, Trin		120
minutum, Hk. f	"	575	1 4	•••	125
miserum, Kærn	"	575	1 37 37	••	120
mitophyllum, Hk. f	27	585			140
Neesianum, Kærn	, ,,	581	Eriococcus glaucescens, Morr.		802
nepalense, Presc	"	584	& Zoll Eriocoryne midularis, Wall.		876
nigricans, Br	"	576) 		680
nilagirense, Steud	"	577			680
nitidum, Ham	"	574	*** A A M	•••	. 680
odoratum, Dalz	"	579		•	849
orysetorum, Mart	"	573	. A		850
polycephalum, Hk. f	"	581			350
Pumilio, Hk. f	"	584	l —		672
pygmæum, Dalz	"	580		i. 672 ,	
quadrangulare, Lour	"	582	1./	•	672
quinquangulare, Linn	**	574	1 TR. 1. 13 Ch. 100		808
quinquangulare, Heyne	511 641			₹.	870
	581,	580		1.	870
rivulare, Dals	₹i.	572	TT 1 1 TOT 0: 4	99	87 0
robustum, Steud	99	577	quinquelocularis, Wight	•••	871
sericans, Mart	"	572	quinquoiocuming, ir igito	•	871
setaceum, Linn	"	572	(A) . 1 . 11 TYP A A. AP		870
setaceum, Benth	"	577	TET-117-L21 TO 0		870
setaceum, Hoyne	**	311	wallonii, DU	19	914

Vol. Pe	ige Erodium	1	Zol.	Page
	53 himalayanum, Royle		i,	434
Eriopetalum attenuatum,	malacoides, Willd.	,	,,	435
Wight iv.	65 nilagiricum, Schlecht.		,,	435
lævigatum, Wight ,,	65 Stephanianum, Willd.		"	434
parviflorum, Wight "	65 stipaceum, Edgew	•••	"	435
	63 tibetanum, Edgew	•••	"	434
	64 violæfolium, Turcz.	•••	"	435
	64 Erophila, DC		ï.	144
	64 vulgaris, DC	•••	"	145
	64 Eruca, Tourn		i.	158
	61 sativa, Lamk	•••	,,	158
	64 Ervum filiforme, Roxb.		iï.	177
	64 hirsutum, Linn		"	177
	64 Lens, Linn		"	179
Saharahrari Uanna " 6	64 Lens, Wall			177
arasinatura Cumt	64 tetraspermum, Linn.	•••	"	177
am Damah "C	61 EBYTHROXYLEA:	•••	;, i.	410
om Wall "	64 Erycala, G. Don		iv.	110
	95 Erycibe, Roxb		v.	180
Wallichianum Danth C	95 camptobotrya, Miq			182
	10 21 14 41 100	•••	,,	183
ahinanga Vagal	10 777 11	•••	"	182
	04 187-11	•••	,,	181
117 - 117 - 2 2 1 Mr. J	00 4 1 0 100	•••	"	181
Eriostemon taraxacifolium,	7 117 11	•••	,,	183
- '	PO 11 11111	•••	"	181
	0,5	•••	"	181
abliana Wall		•••	"	181
39		•••	"	183
hasif-non Maules 1		•••	"	183
alammetrum A DCI 1	70 O-100+1: 01 7	•••	"	
		•••	"	182 181
		•••	"	
Ionaifalium Dana	04 M-1	•••	"	181 182
milano communa DC 1		•••	"	
	70	•••	"	182
Munnoi Clarka		•••	"	180
A DO 1	F1 701 111 701	•••	"	182
	71 Rheedii, Bl	•••	"	181
	72 subspicata, Wall	•••	,,	181
, , , , , , , , , , , , , , , , , , ,	64 Wightiana, Grah	•••	"	181
	70 sp., Hk. f. & T	•••	??	182
	64 Eryngium, Linn	•••	11.	669
" 1 " 1 " 1 " 1 " " 1 " " 1 " " 1 " " 1 " " 1 " " 1 " " 1 " " 1 " " 1 " " 1 " 1 " " 1 " 1 " " 1 " " 1 " 1 " " 1 " 1 " " 1 " 1 " " 1 " 1 " " 1 " " 1 " 1 " " 1 " 1 " " 1 " 1 " " 1 " 1 " " 1 " 1 " " 1 " " 1 " 1 "	65 Billardieri, Delar	•••	"	670
	72 cærulescens, Jaoq	•••	"	670
	70 cæruleum, Bieb		"	669
The state of the s	64 dichotomum, Desf	•••	,,	670
	Heldreichii, Boiss	•••	"	670
	65 Kotschyi, Boiss	•••	"	670
	65 planum, Lindl	•••	"	669
sp., Hk. f. & T iv. 164, 10		•••	i.	152
77 11 TITTE 11 1 44	35 Alliaria, Linn	•••	"	151
	33 altaicum, C. A. Mey.	•••	,,	154
, , , , , , , , , , , , , , , , , , , ,	deflexum, Hk. f. & T.	•••	,,	153
		•••	"	153
· · · · · · · · · · · · · · · · · · ·	7 gracile, J. Gay	•••	,,	153
	34 Griffithii, Boiss	•••	,,	153
cicutarium, Leman ,, 48	34 hieraciifolium, <i>Linn</i> .	•••	,,	158

Erysimum	Val	Page-	Vol. Page
odoratum, Ehrh.?	•••		Erythrochilus indicus, Reinw. v. 410
longisiliquum, Hk. f. & T		154	longifolius, Bl ,, 411
pachyearpum, Hk, f. & T.		153	mollis, Bl ,, 410
patens, J. Gay		153	Erythrochiton Wallichianum,
planisiliquum, Led	••	152	Griff i. 281
repandum, Linn		153	Erythrogyne frutescens, Vis. v. 529
robustum, D. Don	• • •	153	Erythronium indicum, Hb.
strictum, Gærtn		153	Madr vi. 348
Thomsoni, Hk. f	• • • • • • • • • • • • • • • • • • • •	154	Erythropalum, Bl i. 578
Erythracanthus elongatus,			populifolium, Mast., i. 578, ii. 600
D.1. 6 (12).=	iv	. 397	scandens, Bl i. 578
elongatus, Nees		400	vagum, Mast ,, 578
Griffithianus, Nees		400	Erythropsis Roxburghiana,
obtusus, Nees		401	Schott & Endl i. 360
obtusus, Wight		400	Erythrorchis altissima, Bl vi. 89
racemosus, Nees		401	aldinima Lindl 90
70 .1 . 7 /7 17 1	iv		Tin Manage Dakk # 99
altaica, Griseb		100	Erythrospermum, Lam i. 191
1 - 1 - 1 1	-	109	mbetalaggides Cand 101
	•• ,,	101	Erythrotis Beddomei, Hk. f. vi. 388
last Citian Claimale		101	Erythroxylon, Linn i. 414
Taraita lia San		101	hummonioum (Iniff 414
Linear Mallin Olemba	•• ,	109	indiana Podd 414
M D	,	100	Wunthianum Wall Ald
7 77 77 41	•• ,	വര	2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/
	•• ••	101	lamacolotam III. f Alf
	,,	101	Impidum Moon / 415
	,	109	
	•• ••	100	1 A18
Dankan kii A Dan	•• >:	100	Material Param A15
	•• ••	102	aidonomalaides Tana 415
	,	101	1 M M A1E
A	,	101	, , , , , , , , , , , , , , , , , , , ,
	;		
	11	. 190	ESCALLONIEE ii. 389 Esmeralda Catheartii, Rohb.f. vi. 27
	,	100	
	,		1
4 A 1	•••	100	_#.in 1 ind1 100
1. 1	,	3440	
	•••	100	
1241 DI	,		
T)	••• ,		1 3:
		, 190	1 January Jaka Dakk & 100
Mark and the second	••• ,		lanceolata, Rehb. f ,, 109
amalifalia Dank		, 190	moulmeinensis, Par. &
	•••	, 189	Rchb. f , 109
	••• ;		nervosa, Lindl ,, 108
	,		pusilla, Wall ,, 105
	,		Ethalia, Linn iii. 226
	,	, 189	angustifolia, Bojer ,, 227
	•••	, 190	conyzoides, Linn , 227
	•••	, 188	divaricata, Linn " 274
stricta, Rozb	•••	, 189	divaricata, Wall ,, 248
	•••	, 189	gracilis, Delile ,, 227
	•••	,, 190	integrifolia, D. Don , 245
		, 190	ramosa, Roxb ,, 227
		,, 190	sp., Grah 229
Erythrocarpusglomerulatus	,Bl.	v. 460) Eursclepiadeze iv. 2

	Val	Page	Eugenia			₩.,	7
EUBALANOPHOBE	V.	236	cordifolia, Wight			yoı,	Page 491
	ii.	60	corymbosa, Lam.	•••	•••		490
	v .	ĭ	corymbosa, Roxb.		•••	"	478
** 1 / 7		248	corymbosa, Wall.	•••	•••	"	487
THE A 1 111 TO		248	cotinifolia, Jacq.	•••	•••	"	501
	. "	164	crenulata, Duthie	•••	•••	"	490
		165		•••	•••	"	
			cuneata, Wall.	•••	•••	"	495
	Vi		cuneata, Heyne	• • •	•••	,,	500
	vi.	480	cuneata, Duthie	•	•••	,,	485
	. ,;	481	cuspidata, Wall.	•••	•••	"	470
	ii.	470	cyclophylla, Duth	ø	•••	,,	494
	,,	498	oylindrica, Wight	•••	•••	"	479
	,,	508	cymosa, Lam	•••	•••	"	482
	,,	474	cymosa, Roxb	•••	•••	**	476
	,,	479	decora, Thw	•••	•••	"	504
	,,	497	decora, Wall	•••	•••	**	475
amœna, Thw	,,	505	densiflora, DC	•••	•••	"	473
	,,	471	diospyrifolis, Wal	l.	•••	"	472
androsæmoides, Bedd	,,	491	elliptica, Lam			"	501
androsæmoides, Wight.	,,	49 1	elliptica, Wall		•••	"	489
angustifolia, Roxb	. ,,	472	expansa, Duthie	•••		"	491
anisosepala, Duthie	. ,,	481	fasciculata, Wall.		•••	"	502
aques, Burm		473	ferruginea, Wight	•••	•••	"	482
areolata, Duthie		490	ficifolia, Wall	•••	•••	"	476
argentea, Bedd	•	508	filiformis, Wall.	•••	•••		478
Arnottiana, Wight		488	firma, Wall	•••	•••	"	476
		493	floccifers, Thw.		•••	"	504
1 . 1		499	floccosa, Bedd	•••		"	501
TO 11 ' TO 11'.		476	formosa, Wall		•••	**	471
20	•	484	frondose Wall	•••	•••	"	490
L:A:- 777-11		478	frondosa, Wall.	•••	•••	"	499
	,,	475	frutionsa, Roxb.	•••	•••	"	499
	••.	484		•••	•••	"	
borneensis, Miq		496	fulva, Thw fusiformis, Duthie	•••	•••	"	504 479
brachiata, Roxb		502	l <u>-</u> '		•••	,,	
bracteata, Rozb	••	488	Gardneri. Bedd.	•••	•••	"	489
bructeolata, Wight	•••	501	glandulifera, Roxb		•••	"	485
busifolia, Lam			gracilis, Bedd	•••	•••	"	505
calcadensis, Bedd		502	grandis, Wight	•••	•••	"	475
calophyllifolia, Wight	, ,,	494	grata, Wight	•••	•••	**	486
calyptrata, Roxb	. ,,	499	Griffithii, Duthie	•••	•••	,,	481
capillaris, Wall	• `,,	478	Helferi, Duthie	•••	•••	,,	480
? capitellata, Arn	. ,,	553	hemispherica, Wig	ht	•••	,,	477
caryophyllma, Wight caryophyllata, Willd	. ,,	490	Heyneana, Duthie	•••	•••	"	500
	. ,,	506	Heyneana, Rottl.	•••	•••	,,	500
caryophyllifolia, Lam	. ,,	499	hypoleuca, Thw.	•••	•••	,,,	501
cerasiflora, Kuız	. ,,	478	inophylla, Roxb.	•••	• • •	` ,,	480
cerasoides, Roxb	. ,,	498	insignis, Thw	•••	•••	,,	504
chlorantha, Duthie	. ,,	487	Jambolana, Lam.	•••	•••	,,	499
cinerea, Kurz	. ,,	496	Jambos, Linn	•••	•••	"	474
claviflora, Roab		484	javanica, Lamk.			",	474
codyensis, Munro		501	javanica, Lum		•••	,,	478
colorata, Duthis		492	Jossinia, Duthie		•••	"	500
comosa, Wall		492	khasiana, Duthie	•••	•••	"	491
concinna, Thw		506	Kurzii, Duthie	•••	•••	"	478
concinna, Wall		482	· læta, Ham	•••	•••	"	479
conglomerata, Duthis	•••	497	leevicaulis, Duthie	•••	•••	"	492
contracta, Wall		485	lanceæfolia, Roxb.	•••	•••	"	475
		•	,,	•••		"	

Tree-i-		_	I Marania			
Eugenia		Page 477	Eugenia			Page 507
lanceolaria, Roxb		485	racemosa, Linn	•••	ii.	480
lanceolata, Lam		478	ramosissima, Wull	•••	"	480
laurifolia, Roxb	• • • •	578	reticulata, Wight	•••	"	492
laurina, Willd	••	476	revoluta, Wight	•••	,,	482
lepidocarpa, Wall,		484		•••	"	504
leptantha, Wight	• • •	486		•••	"	482
linearis, Duthie		487	Rottleriana, W. & A.	•••	"	502
lineata, Duthie	••	488	rotundifolia, Wight	•••	"	494
lissophylla, $Bedd.$ lucida, $Lam.$		501	Roxburghiana, Wall.	•••	**	475
		496	Roxburghii, DC	•••	"	502
makanidan Wald	•	505	rubens, Roxb		"	482
macrocarpa, Rosb		474	rubicunda, Wight		"	495
macrophylla, Lam		471	rubicunda, W. & A.		"	500
macrosepala. Duthie	,,,	501	rubricaulis, Duthie		"	487
Maingayi, Duthie		484	rufo-fulva, Thiv		"	503
malabarica, Bedd	"	497	salicifolia, Buch		"	472
malaccensis, Linn		471	salicifolia, Grah		"	500
mangifolia, Wall	,,	480	salicifolia, Wall		"	500
miorantha, Bedd	, ,,	483	salicifolia, Wight	•••	,,	500
microcalyx, Duthis	,,	493	scabrida, Wall		,,	486
microphylla, Bedd	,,	505	sclerophylla, Bedd		,,	494
Mooniana, Wight	•	503	scoparia, Duthie		,,	489
Mooniana, Wight	,,	505	singampattiana. Be ld.		,,	506
Mooniana, Wight Moorei, F. Muell	"	499	skiophila, Duthie		"	486
montana, Wight	,,	488	spicato, Lam		"	485
Munronii, Wight	"	472	Stocksii, Duthie		.,	498
myrtifolia, Roxb	,,	483	subavenis, Duthic	•••	,,	48 9
Neesiana, Wight	,,	493	subdecussata, Duthic		,,	491
nigrescens, Poir	,,	482	sylvestris, Moon		,,	493
nitida, Duthie	,,	496	tenuis, Duthie		,,	500
oblata, Roxb	"	492	ternifolia, Roxb		,,	471
oblongifolia, Duthie	,,	491	terpnophylla, Thw.	•••	,,	503
obovata, Wall	,,	491	tetraëdra, Duthic	•••	,,	476
obtusifolia, Roxb	,,	500	tetragona, Wight	•••	,,	497
occlusa, Kurz	,,	498	Thumra, Roxb	•••	,,	481
octopetala, Ham	,,	482	Thwaitesii, Duthie	•••	,,	506
? odorata, Wight	"	496	toddalioides, Wight	•••	,,	482
oleina, Wight	,,	483	? trinervia, DC	•••	,,	468
oligantha, Bedd	"	494	tristis, Kurz	•••	,,	477
olivifolia, Duthie	"	495	tumida, Duthie	•••	,,	487
operculata, Rozb	"	498	umbrosa, Thw	•••	,,	489
pachyphylla, Kurz	,,	477	uniflora, Lina	•••	"	505
Paniala, Roxb	"	498	valdevenosa, Duthie	•••	"	489
papillosa, Duthie	,,	495	venulosa, Duthie	•••	,,	490
pauciflora, Wight	"	479	venusta, Roxb	•••	17	488
pellucida, Duthie	"	485	verecunda, Duthie	•••	,,	496
penangiana, Duthie	"	486	Wallichii, Wight	•••	"	475
pendens, Duthie	406	475 498	Wightiana, Wight Wightii, Bedd	•••	"	485 479
		470	********	•••	"	505
polygama, Roxb	ii.	472	Willdenowii, DG Willdenowii, Wight	•••	"	502
polypetala, Wight	,,	475	wynaadensis, Bedd.	•••	"	506
præcos, Roxb	"	506	xanthocarpa, Thw	•••	"	503
pulchella, Roxb	"	472	zeylanica, Wight	•••	"	485
purpurea, Roxb	"	495	zeylanica, Roxb	•••	"	502
pustulata, Duthie	**	487	zeylanica, Willd	•••	"	505
pyrifolia, Duthie	"	٠.		•••	"	

Francis	7 -1 1	D	Enonword		TF-1	D
Eugenia	V ol.∶ ii.	506	Euonymus angulatus, Wight		Vol.∶ i.	610
sp., Griff Eugona superba, Salisb		358	angulatus, Wight atropurpureus, Roxb.			612
		112	4 . TYP. 37		"	610
Eulalia argentea, Brongn	₹ii.				"	610
concinna, Nees		109	bullatus, Wall		"	609
cotulifera, Munro		108	calocarpus, Kurz		"	
japonica, Trin	• ,,	118	capillaceus, Wall		"	614
mollis, Munro	• ,,	111	cinereus, Laws		"	611
nepalensis, Trin	•	107	crenulatus, Wall	• •••	"	608
EULINEÆ	. 1.	410	dichotomus, Heyne	• •••	"	609
Eulophia, Br. vi. 1, 177,	. 17.	78	echinatus, Wall	• •••	"	611
Eulophia, $Br.$ vi. 1, 177,	, 178,	195	filiformis, Wall	• •••	"	614
albiflora, Edgew		2	fimbriatus, Wall	• •••	"	611
andamanensis, Rchb. f	, ,,	8	frigidus, Wall		"	611
atro-virens, Lindl	. ,,	8	garcinifolius, Roxb.	•••	**	614
bicarinata, Hk . f	. ,,	6	glaber, Rozb		,,	609
bicolor, Dalz	· ,,	6	glaucus, Turoz		,,	610
brachypetala, Lindl	, ,,	2	Goughii, Wight		"	608
bracteosa, Lindl	. ,,	3	grandiflorus, 'Wall.	•••	"	608
burmanica, Hk. f	, ,,	5	Griffithii, Kurs		,,	611
campestris, Wall		4	grossa, Wall		"	623
candida, Hk . f		6	Hamiltonianus, Wall		11	612
carinata, Lindl	, ,,	1	indicus, Heyne		"	608
	.vi. 5,	. 195	japonicus, Wall		"	612
densiflora, Lindl	•	5	javanicus, Bl		"	607
elata, Hk. f	-	3	lacerus, Ham		"	608
explanata, Lindl	. ," vi. 3,		? læta, Wall			614
flava, Hk. f	•		lucidus, D. Don		"	612
gramines, Lindl	vi. 2,		? micranthus, D. Don		"	611
grandistora, Lindl	• •	_	nitidus, Benth		"	610
		821			"	615
hastata, Lindi hemileuca, Lindi		4	panioulatus, Wight		"	609
1		2	pendulus, Wall		"	612
herbaces, Lindl holochils, Coll. & Hemsl	. "	196	pterocladus, Hohen.		"	610
inconspicua, Griff		2	punctatus, Wall	•••	"	610
lachnocheila, Hk. f	• • • • • • • • • • • • • • • • • • • •	2			"	608
macrobulbon, Par. & Rehb.	. ,,	7			"	611
		7	scandens, Grah serratifolius, Bedd.		"	609
		4	P serrulatus, Wall	•••	"	609
macrostachya, Lindl maculata, Rehb. f	•••	8	sphærocarpus, Hassk.		"	607
maculata, Rend. I		4			"	607
Mannii, Hk. f			sumatranus, Miq		"	612
monophylla, Sp. Moore		8	theofolius, Wall		"	608
nuda, Lindl		5	Thwaitesii, Laws		"	610
obtusa, Hk. f		3	timorensis, Zipp		"	
ochreata, Lindl		2	Tina, Ham		"	623
pratensis, Lindl		4	tingens, Wall		"	610
promensis, Lindl		820	vagans, Wall		"	611
ramentacea, Lindl		4	vagans, Wall	• •••	**	611
ramentacea, Wight	• ,,	4	Walkeri, Wight		**	608
rupestris, Lindl		4	zeylanious, Moon		,,	608
	. vi. 8		sp., Bedd	• • • • •	"	542
	. v i. 6		_ sp., Wall		."	610
stenopetala, Lindl	. vi.		EUPATORIEÆ	iii.		242
	vi. 1		Eupatorium, Linn		iii.	243
<i>sp.</i> , Trim	. vi.8		asperum, Roxb		,,	233
EUMYRSINEÆ	. jii.		Ayapana, Vent		,,	244
Euonymus, Linn	. i.	607	birmanicum, DC		"	244
acutangulus, Wight	. ,,	610	candicans, Wall		,,	386

		_	1 March - 12.	_		_
Eupatorium	•••	Page	Euphorbia			Page
	iii.		Clarkeana, Hk. f	•••	♥.	253
	,,	239 244	coccines, Roth	•••	"	248 261
dicline, Edgew	,,		cognata, Boiss	•••	"	261
1 100	,,	$\begin{array}{c} 234 \\ 244 \end{array}$	consanguinea, Klotz.	•••	,,	261
77	,,	244	cornigera, Boiss	•••	"	251
	,,	259	corrigioloides, Boiss.	•••	"	247
	,,	243	cristata, Heyne	•••	"	264
	,,	239	cuneifolia, Roxb	•••	"	249
	,,	244	decumbens, Willd	•••	"	246
	,,	244	? dichotoma, Roxb ? disticha, Engelm.	•••	"	251
	ii. 235			•••	"	264
		235	divergens, Klotz dracunculoides, Lamk.	•••	"	262
		243	Julain Timm	•••	"	261
	,,	244	Edgeworthii, Boiss.	•••	"	261
	,,	241		•••	"	246
	,, ii. 234		1 7 7	•••	**	247
		243		•••	"	250
		233	epiphylloides, Kurz	•••	"	254
	,,	243	erythroclada, Boiss.	•••	**	247
	,,	230	Salanda Tinu	•••	,,	263
	,,	244	4 2 · 1 TT	•••	**	247
	,,	214	C L	•••	"	262
	,,	386	C. 12-A. Trans	•••	"	252
	••• ,,	243	77 1 . 1	•••	"	252
	,,	244	1 1 1 10	•••	"	252
suaveolens, Wall	,,	234	Considerance II	•••	of	257
	,,	244	galioides, Boiss	•••	,,	253
	,,	243	1		239	266
	,,	238	geniculata, Orteg glauca, Roxb		v.	264
*	y.	145	17	•••		264
Euphale umbelliflora, Bl	: 557	, 690	graminea, Kon granulata, Forsk	•••	"	252
Euphora exstipulatis, Griff.	_	214	granulata, Royle		"	253
		257	Griffithii, Hk. f		"	259
	,,	252	halophila, Miq		"	248
70.1	•• ,,	265	helioscopia, Linn		"	262
androsemoides, Denust	,,	249	P Heyneana, Boiss			253
. * 0 11 . TT		265	Heyneana, Spreng	•••	"	253
	**))	255	himalayensis, Boiss.		"	258
	•• ;;	255	himalayensis, Klotz.		"	258
		261	hirta, Linn		"	251
A TO U.S.	,,	256	hispida, Boiss	•••	"	265
	,,	252	hypericifolia, Linn.		,,	249
11 7 13	•••	248	hypericifolia, Boiss.		"	250·
	,,	248	iberica, Boiss		,,	265
	,,	251	inaquilatera, Sonder		,,	265
7 10 7 771	,,	248	indica, Aitch. & Hemsl.		"	250
	v. 249,		indica, Boiss		,,	250
	., v.	254	indica, Lamk	•••	"	249
		252	indica, Wall		"	251
	,,	265	involucrata, Wall		"	258
	• • • • • • • • • • • • • • • • • • • •	247	Jacquemontii, Boiss.	•••	"	258
YET 11	,,	251	kanaorica, Boiss		"	264
	•• ,,	261	khasyana, Boiss		"	262
	,,	249	læta, Heyne		"	264
	,,	256	lævigata, Vahl		"	248
A 61 TO 1.	,,	253	lævigata, ? Wall	• • •	,,	248
	,,		•			

Euphorbia		Vol. 1	Page	Euphorbia	7	701. I	Page
lævis, Poir		v.	248	strobilifera, Dalz	•••	٧.	246
lanceolaria, Heyne	•••	,,	26.4	tenuis, Ham	:	,,	266
lanceolata, Heyne	•••	"	263	m '		"	260
ligulatia, Roxb		,,	255	thymifolia, Burm		"	252
linearifolia, Roth		"	249	thymifolia, Wall	v. 2	51,	252,
linearis, Heyne		"	249	1	2	253,	254
linifolia, Russell		,,	264	thyrsoidea, Boiss		₹.	265
longifolia, D. Don		"	261	tibetica, Boiss	•••	,,	260
longistyla, Boiss		"	247	Tirucalli, Linn	•••	"	254
maculai , Aubl		"	252	tortilis, Rottl		"	256
Maddeni, Boiss		"	263	trigons, Haw		"	256
micractina, Boiss		"	261	uniflora, Rosb		,,	266
microphylla, Heyne	▼.	252,	266	uniflora, Dalz. & Gibs.		"	253
myrtifolia, Edgew		٧.	261	uniflora, Roxb		"	254
nana, Royle	•••	,,	257	uniflora, Wall		"	263
nepalensis, Boiss	•••	,,	264	varians, Haw	•••	"	255
nereifolia, Roxb	•••	,,	255	variegata, Heyne		"	246
neriifolis, Linn	•••	"	255	villosa, Royle		"	252
nilaghirica, Miq		,,	265	riminalis, Mill		,,	254
Nivulia, Ham		"	255	Wallichiana, Boise.	•••	,,	253
notoptera, Boiss		,,	247	Wallichii, Hk. f	•••	"	258
oligantha, Boiss	•••	,,	246	Wightians, $Hk. f.$	• • •	"	248
orbiculata, Miq		,,	253	Wightiana, Boiss	• • •	,,	264
oreophila, Miq	•••	,,	264	zornioides, Boiss	•••	"	246
pallens, Dillw	•••	"	248	<i>sp.</i> , Aitch	•••	,,	258
papilligera, Boiss	•••	,,	249	sp., Griff	•••	.,,	259
parviflora, Boiss	•••	"	250	sp., Str. & Wint			263
parviflora, Lamk	•••	"	251	sp., Wall v. 248, 24			
parviflora, Linn	•••	"	249	262, 2	64, 4		
peltata, Roxb	•••	"	262	EUPHORBIACEÆ	•••	♥.	239
pentagona, Royle	•••	"	257	EUPHORBIES		٧.	240
Peplus, Linn	•••	· 99	266	Euphoria attenuata, Plano	h. i.	684,	690
pilosa, Linn	•••	"	260	Danura, Wall			690
pilulifera, Linn	•••	"	250	fuscata, Benth. & Hk. f.			
platylepis, Done	•••	"	24 6	Gardneri, Bonth. & Hk.	f.	i.	690
procera, Bieb	•••	"	260	glabra, Bl	•••	"	687
prolifera, Ham	•••	,,	264	Litchi, Juss		"	688
prostrata, Ait	•••	"	266	Litchi, Wall			690
prostrata, Grah	•••	"	252	Longana, Bl	•••	i.	686
prostrata, Torr	•••	211	253	Longana, Lamk	•••	"	699
prunifolia, Jacq		239,		Nephelium, DC	•••	"	687
pycnostegia, Boiss.	•••	▼.	246	Nephelium, Wall		"	690
pyrifolia, Lamk	•••	**	266	Noronhiana, Bl			690
Thipsaloides, Lem	•••	"	254 251	punicea, Lamk	•••	í.	687
roses, Retz	•••	"	2 63	pupillum, Steud	• • •	"	689 690
Rothiana, Spreng	•••	"	257	rimosa, Royle		201	
Royleana, Boiss	•••	"		rubra, Royle			690
rubicunda, Bl	 Mand	**	252 253	undulata, Heyne		Ì. 894	689 840
sanguinea, Hochst. & S		•••	255 251	verticillata, Lindl			690
satureioides, Lamk	•••	"	264	verticillata, Wall			690 690
? segetalis, Grah	•••	**	253	werocarpa, Bl			690 600
serpens, Engelm		"	258	sp., Wall Euphrasia, Linn		100, i▼.	690 304
serpens, Kunth sessiliflors, Roxb		"	257	coromandeliana, Roth			302
sessilinora, Roxo sikkimensis, Boiss	•••	**	259	depauperata, Benth.	•••	"	305
sikkimensis, Boiss		"	259	P glandulosa, Benth.	•••	"	304
a. 1 . D	•••	"	259	1 A3 44 19	•••	"	305
Stracheyi, Boiss	•••	"		Odontites, Linn	•••	"	900

### Suppress	Ø			Marana Tal Bara
Turbra Pers.	**** * * * * * * * * * * * * * * * * *			
### ### ### ### ### ### ### ### ### ##				
Tavegana, Wall.			7	701
EUPHRASIER iv. 249, 804 EUPODOSTERER v. 62 EUPOTOGONER v. 22 Euproboscis pygmæa, Griff vi. 86 Eupteles, Sieb. & Zucc. i. 39 pleiosperma, Hk. f. & T. 39 Eupteron acuminatum, Miq. ii. 727 sp., Kurs				, , , , , , , , , , , , ,
EUPOLYGONEZ V. 62 EUPOLYGONEZ V. 22 EUPOLYGONEZ V. 22 EUPOLOSOCIS PYGMEZO, G. 1. 39 Pleiosperma, H. F. & T. 39 Eupteron acuminatum, Miq. ii 727 sp., Kurz , 734 Eupyrena glabra, W. & A. iiii 127 Eurotia, Adans v. 8 Eurya, Thunb i. 294 aouminata, DC , 285 acuminata, Royle , 285 acuminata, Royle , 285 acuminata, Wall , 285 argustifolia, Miq , 292 argustifolia, Miq , 285 chinensis, Hr. f. & T , 285 chinensis, Hr. f. & T , 285 fasciculata, Wall , 285 fasciculata, Wall , 285 fasciculata, Wall , 285 fasciculata, Wall , 284 elliptica, Gardn , 284 japonica, Thunb , 284 japonica, Thunb , 284 japonica, Thunb , 284 fascopatala, Gardn , 285 phyllanthoides, Bl , 2				
EUPOLYGONES				Eurythalia carinata, D. Don 17. 118
Euproloscis pygmæa, Griff, vi. 86 Euproloscis Pygmæa, Griff, vi. 86 Pupteron acuminatum, Miq. ii. 727 py, Kurs		v.		
Euptelea, Sieb. & Zucc. i. 39 pleiosperma, Hk. f. & T. sp., Kurs. Tys., Kurs. Tys., Kurs. Tys., Kurs. Tys., Kurs. Tys., Kurs. Tys., Thunb. Secretoides, O. A. Mey. Eurys., Thunb. Eurys., Thunb. Secretoides, O. A. Mey. Beauminata, Royle Secretoides, O. A. Mey. Secretoides, O. A. Mey		- 1		
Pleiosperma, Hk. f. f. T. 39				, , , , , , , , , , , , , , , , , , ,
### Eupyrena glabra, W. & A. iii. 127 Eurycia, Adans v. 8 Eurya, Thunb. i. 284 acuminata, Royle 285 acuminata, Royle 285 acuminata, Royle 285 acuminata, Wall 285 acuminata, Wa	Euptelea, Sieb. & Zucc	i.		
### Eupyrena glabra, W. & A. iii. 127 Eurycia, Adans v. 8 Eurya, Thunb. i. 284 acuminata, Royle 285 acuminata, Royle 285 acuminata, Royle 285 acuminata, Wall 285 acuminata, Wa	pleiosperma, Hk . f . x T .	,,		,, ===
Euryvena glabra, W. & A. iii. 127 Eurotis, Adans v. 8 ceratoides, C. A. Mey. , 8 Eurya, Thunb. i. 284 acuminata, DC 295 acuminata, Royle 285 acuminata, Royle 285 acuminata, Wall 285 acuminata, Wall 285 acuminata, Wall 285 bifyaria, Wall 285 chinensis, Br 285 chinensis, Br 285 chinensis, Br 285 coneccarpa, Korth 284 euprista, Korth 284 euprista, Korth 285 fasciculata, Ham 285 fasciculata, Wall 284 japonica, Thunb 284 japonica, Thunb 284 japonica, Bedd 284 lucida, Wall 285 multiflora, DC 285 multiflora, DC 285 multiflora, Bl 285 phyllanthoides, Bl 285 sirtida, Korth 285 phyllanthoides, Bl 285 serrata, Bl 285 trichogyna, Bl 284 trichocarpa, Korth 285 serrata, Bl 286 serrata,	Eupteron acuminatum, Miq.	ii.		
Eurotis, Adans v 8	sp., Kurz	,,	734	
Eurotis, Adans v 8	Eupyrena glabra, W. & A	. iii.	127	C21.111 111 111 111 111 111
Eurya, Thunb.	Eurotis, Adans		8	
Eurya, Thunb. acuminata, DC. acuminata, Royle acuminata, Wall. 285 bleucocarpa, Jack 526 pulcherrima, Wall. 525 acuminor, Jack 526 pulcherrima, Wall. 625 acuminor, Jack 526 pulcherrima, Wall. 625 acuminor, Jack 626 pulcherrima, Wall. 625 acuminor, Jack 626 pulcherrima, Wall. 628 acuminor, Jack 628 acumi	ceratoides, C. A. Mey	,,	8	Euthemis, Jack i. 526
acuminata, DC. 285 acuminata, Royle 285 acuminata, Royle 285 acuminata, Royle 285 acuminata, Wall. 285 acuminata, Royle 285 bilococarpa, Jack 525 acuminata, Royle 285 bilococarpa, Jack 285 285 acuminata, Royle 285 bilococarpa, Jack 285 bilococarpa, Jack 285 bilococarpa, Jack 285 acuminata, Royle 285 bilococarpa, Jack 285 bilococarpa, Jack 285 bilococarpa, Jack 285 bilococarpa, Jack 285 acuminata, Royle 285 bilococarpa, Jack 28	Eurya, Thunb		284	? elegantissima, Wall , 526
acuminata, Royle			285	elegantissima, ? Wull ,, 525
acuminata, Wall			285	
292			285	
angustifolia, Wall			292	
bifaria, Wall		•••	285	
ceylanioa, Wight			285	
chinensis, Br , 285 chinensis, Hk. f. & T , 285 coneocarpa, Korth , 284 elliptica, Gard , 284 euprista, Korth , 285 fasciculata, Ham , 285 fasciculata, Wall , 284 japonica, Thunb , 284 japonica, Thunb , 284 lasiopetala, Gardn , 283 lucida, Wall , 285 multiflora, DC , 285 multiflora, DC , 285 minalaioum, Hk. f. § T , 152 Eutriana abyssinica, Br vii. 284 Eutropis, Falo iv. 20 Euvaccinie iii. 442 Euxolus caudatus, Moq , 721 loleraceus, Dalz. & Gibs , 721 oleraceus, Moq , 721 oleraceus, Moq , 721 multiflora, DC , 285 multiflora, Gardn , 2			285	
chinensis, Hk. f. & T , 285 coneccarpa, Korth , 284 elliptica, Gard , 284 euprista, Korth , 285 fasciculata, Ham , 285 fasciculata, Ham , 285 fasciculata, Wall , 284 japonica, Thunb , 284 japonica, Bedd , 284 lasiopetala, Gardn , 283 lucida, Wall , 285 membranacea, Gardn , 285 multiflora, DC , 285 multiflora, DC , 285 mitida, Korth , 285 phyllanthoides, Bl , 284 salicifolia, Bl , 285 symplocina, Bl , 285 symplocina, Bl , 285 symplocina, Bl , 284 trichocarpa, Korth , 284 trichocyna, Bl , 285 trichogyna, Bl , 285 willichiana, Planch , 284 Wallichiana, Steud , 284 Wightiana, Wall , 285 ferox, Salisb , 115 ferox, Salisb , 115 ferox, Planch , 115 minulæfolium, Hk. f. § T , 152 Eutriana abyssinica, Br vii. 284 Eutriopogon, Steud vii. 284 Eutropis, Falc vii. 284 Euvaccinie, Br vii. 284 Evacuadatus, Moq 721 lividus, Moq 721 viridis, Moq 721 viridis, Moq 721 viridis, Moq 721 Evaw indica, Ham iii. 289 Evaw indica, Ham iii. 289 Fraxinifolia, Hk. f. g. 77: 489 fraxinifolia, Hk. f. g. 489 glabra, Bl 489 glabra, Bl 489 glabra, Bl 488 Lamarckiana, Benth 488 Lamarckiana, Benth 488 Lamarckiana, Benth 487 meliæfolia, Benth 489 Frobusta, Hk. f. g. T 489 Frobusta, Hk. f. g. T 489 Fristyla, W. & A 284 Friedyalander, Moq 721 Furdicia, Wall 489 Friedyalander, Moq 721 Furdicia, Wall 489 Friedyalander, Moq 721 Furdicia, Wall		•••	285	Entreme Re i 151
coneocarpa, Korth. ,		••	285	himalaicum, Hk. f. & T , 152
Elliptica, Gard		•••	284	primulæfolium, Hk. f. & T. , 152
### ### ##############################			284	Eutriana abussinica, Br vii. 284
fasciculata, Ham.		•••		
fasciculata, Wall.	A		285	
japonica, Bedd			284	
Japonica, Bedd.			284	Euxolus caudatus, Mog iv. 721
lasiopetala, Gardn.			284	1 1' 'J M //O1
lucida, Wall.			283	James Dala & Ciba 791
membranacea, Gardn. "285" polygamus, Moq. "721 multiflora, DC. "285" viridis, Moq. "721 mitida, Korth. "284" Evax indica, Ham. iii. 289 parvifolia, Gardn. "285" Evai amara, Comm. ii. 42 Evodia, Forst. i. 487 Roxburghti, Wall. "284" Evodia, Forst. i. 487 Roxburghti, Wall. "285" fraxinifolia, Hk. f. "490 serrata, Bl. "285" glavra, Miq. "490 symplocina, Bl. "284" graccilis, Kurz. "488 trichocarpa, Korth. "285" Lamarckiana, Benth. *488 trichogyna, Bl. "285" Latifolia, DC. *489 tristyla, W. & A. "284" Marambong, Miq. *487 vitiensis, A. Gray "284" meliesfolia, Benth. *489 Wallichiana, Planch "285" robusta, Hk. f. *489 Wallichiana, Wall. "284" Roxburghiana, Benth. *489 Wughtiana, Wall. "284" Roxburghiana, Benth. <td></td> <td></td> <td>285</td> <td>oleraceus, Moq ,, 721</td>			285	oleraceus, Moq ,, 721
multiflora, DC. "285 viridis, Moq. "721 sitida, Korth. "284 Evax indica, Ham. iii. 289 parvifolia, Gardn. "285 Evoa amara, Comm. ii. 428 Roxburghii, Wall. "284 Evodia, Forst. i. 487 Roxburghii, Wall. "284 Evodia, Forst. i. 487 accedens, Miq. "489 salicifolia, Hk. f. "490 symplocina, Bl. "284 glabra, Bl. "490 systyla, Miq. "284 glavca, Miq. "490 systyla, Miq. "284 gracilis, Kurz "488 trichocarpa, Korth. "285 Lamarckiana, Benth. "488 trichogyna, Bl. "285 Latifolia, DC. "488 vitiensis, A. Gray "284 Marambong, Miq. "487 witiensis, A. Gray "284 meliæfolia, Benth. "489 Wallichiana, Planch. "285 Roxburghiana, Benth. "489 Wallichiana, Wall. "284 Roxburghiana, Benth. "489 Wightiana, Wall. "284			285	
sitida, Korth. "284 Evax indica, Ham. iii. 289 parvifolia, Gardn. "285 Evia amara, Comm. ii. 42 phyllanthoides, Bl. "284 Evodia, Forst. i. 487 Roxburghii, Wall. "284 Evodia, Forst. i. 487 accedens, Miq. "489 salicifolia, Hk. f. "490 serrata, Bl. "285 glabra, Bl. "489 symplocina, Bl. "284 glavca, Miq. "489 systyla, Miq. "284 glavca, Miq. "488 trichogyna, Bl. "285 Lamarckiana, Benth. "489 tristyla, W. & A. "284 Marambong, Miq. "489 Wallichiana, Planch. "285 meliæfolia, Benth. "490 Wallichiana, Steud. "285 robusta, Hk. f. "488 Wightiana, Wall. "284 Roxburghiana, Benth. "487 Wightiana, Wall. "284 rutæcarpa, Hk. f. & T. "1490 Euryale, Salisb. "115 triphylla, DC. "488 ferox, Planch. "115			285	
parvifolia, Gardn. "285 Evia amara, Comm. ii. 42 phyllanthoides, Bl. "284 Evodia, Forst. i. 487 Roxburghii, Wall. "284 accedens, Miq. ", 489 serrata, Bl. "285 glabra, Bl. ", 490 symplocina, Bl. "284 glavca, Miq. ", 490 systyla, Miq. "284 glavca, Miq. ", 490 systyla, Miq. "284 gracilis, Kurz. ", 488 trichogyna, Bl. "285 Latifolia, DC. ", 489 tristyla, W. & A. "284 Marambong, Miq. ", 487 vitiensis, A. Gray "284 meliesfolia, Benth. ", 489 Wallichiana, Planch "285 pedunculosa, Hk. f. ", 489 Wightiana, Wight "284 Roxburghiana, Benth. ", 488 Wightiana, Wall. "284 Roxburghiana, Benth. ", 489 Euryale, Salisb. ", 115 triphylla, DC. ", 488 ferox, Planch ", 115 triphylla, Bedd. ", 487 viticina, Wall. ",	nitida, Korth		284	Evan indica, Ham iii. 289
phyllanthoides, Bl. " 284 Evodia, Forst. i. 487 Roxburghii, Wall. " 284 accedens, Miq. " 489 salicifolia, Bl. " 285 fraxinifolia, Hk. f. " 489 symplocina, Bl. " 284 glabra, Bl. " 489 systyla, Miq. " 284 glavca, Miq. " 490 systyla, Miq. " 285 Lamarckiana, Benth. " 488 trichogyna, Bl. " 285 Latifolia, DC. " 489 tristyla, W. & A. " 284 Marambong, Miq. " 487 vitiensis, A. Gray " 284 Marambong, Miq. " 489 Wallichiana, Planch " 285 robusta, Hk. f. " 489 Wallichiana, Wight " 284 Roxburghiana, Benth. " 489 Wightiana, Wall. " 284 Roxburghiana, Benth. " 489 Euryale, Salisb. " 115 triphylla, DC. " 488 ferox, Planch " 115 triphylla, Bedd. " 487 ferox, Planch " 115 triciona, Wall. " 489 viticina, Wall. "	parvifolia, Gardn		285	Evia amara, Comm ii. 42
Roxburghii, Wall.			284	
salicifolia, Bl. , 285 fraxinifolia, Hk. f. , 480 serrata, Bl. , 285 glabra, Bl. , 489 symplocina, Bl. , 284 glauca, Miq. , 489 systyla, Miq. , 284 gracilis, Kurz , 488 trichogyna, Bl. , 285 Lamarckiana, Benth. , 489 tristyla, W. & A. , 284 Marambong, Miq. , 487 vitiensis, A. Gray , 284 meliæfolia, Benth. , 490 Wallichiana, Planch. , 285 robusta, Hk. f. , 489 Wallichiana, Steud. , 285 robusta, Hk. f. , 489 Wightiana, Wight , 284 Roxburghiana, Benth. i 487, 674 Wightiana, Wall. , 284 rutæcarpa, Hk. f. & T. i 490 Euryale, Salisb. i 115 triphylla, DC. , 488 ferox, Planch. , 115 viticina, Wall. , 489 indica, Planch. , 115 Evolvulus, Linn. i v. 220			284	
serrata, Bl. , 285 glabra, Bl. , 489 symplocina, Bl. , 284 glauca, Miq. , 490 systyla, Miq. , 284 gracilis, Kurz , 488 trichocarpa, Korth. , 285 Lamarckiana, Benth. , 488 tristyla, W. & A. , 284 Marambong, Miq. , 487 vitiensis, A. Gray , 284 Marambong, Miq. , 487 Wallichiana, Planch , 285 pedunculosa, Hk. f. , 489 Wallichiana, Steud , 285 pedunculosa, Hk. f. , 488 Wightiana, Wight , 284 Roxburghiana, Benth. i. 487, 674 Wightiana, Wall. , 284 Roxburghiana, Benth. i. 487, 674 triphylla, DC. , 488 ferox, Salisb. , 115 triphylla, Bedd. , 487 ferox, Planch , 115 tricina, Wall. , 489 indica, Planch , 115 Evolvulus, Linn iv. 220	salicifolia, Bl		285	[
symplocins, Bl. , 284 glauca, Miq. , 490 systyla, Miq. , 284 gracilis, Kurz , 488 trichocarpa, Korth. , 285 Lamarckiana, Benth. , 488 trichogyna, Bl. , 285 latifolia, DC. , 489 tristyla, W. & A. , 284 Marambong, Miq. , 487 vitiensis, A. Gray , 284 meliesfolia, Benth. , 490 Wallichiana, Planch. , 285 pedunculosa, Hk. f. , 489 Wightiana, Wight , 284 Roxburghiana, Benth. , 488 Wightiana, Wall. , 284 Roxburghiana, Benth. i. 487, 674 wightiana, Wall. , 284 rutsecarpa, Hk. f. & T. i. 490 Euryale, Salisb. , 115 triphylla, DC. , 488 ferox, Planch. , 115 viticina, Wall. , 489 indica, Planch. , 115 Evolvulus, Linn. iv. 220	serrata, Bl	,,	285	B
systyla, Miq. , 284 gracilis, Kurz , 488 trichocarpa, Korth. , 285 Lamarckiana, Benth. , 488 trichogyna, Bl. , 285 latifolis, DC. , 489 tristyla, W. & A. , 284 Marambong, Miq. , 487 vitiensis, A. Gray , 284 Marambong, Miq. , 487 Wallichiana, Planch. , 285 pedunculosa, Hk. f. , 489 Wallichiana, Steud. , 284 robusta, Hk. f. , 487 Wightiana, Wight , 284 Roxburghiana, Benth. i. 487, 674 Wightiana, Wall. , 284 rutmearpa, Hk. f. & T. i. 490 Euryale, Salisb. , 115 triphylla, DC. , 488 ferox, Planch. , 115 viticina, Wall. , 489 indica, Planch. , 115 Evolvulus, Linn. iv. 220	symplocina, Bl	. ,,	284	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
trichocarpa, Korth. , 285 trichogyna, Bl , 285 tristyla, W. & A. , 284 vitiensis, A. Gray , 284 Wallichiana, Planch , 285 Wightiana, Wight , 284 Wightiana, Wall , 284 Wightiana, Wall , 284 Euryale, Salisb , 115 ferox, Planch , 115 ferox, Planch , 115 triphylla, Bedd , 489 indica, Planch , 115 triphylla, Linn , 489 trichocarpa, Korth , 489 latifolia, DC , 489 Marambong, Miq. , 487 meliæfolia, Benth , 490 pedunculosa, Hk. f. , 489 robusta, Hk. f. , 487, 674 rutæcarpa, Hk. f. & T. i. 490 triphylla, DC , 488 ferox, Planch , 115 triphylla, Bedd , 487 sindica, Planch , 115 Evolvulus, Linn , 489	systyla, Miq	. ,,		gracilis, Kurz ,, 488
trichogyna, Bl. ", 285 latifolis, DC. ", 489 tristyla, W. & A. ", 284 Marambong, Min. ", 487 vitiensis, A. Gray ", 284 meliæfolis, Benth. ", 489 Wallichiana, Planch ", 285 pedunculosa, Hk. f. ", 489 Wightiana, Steud ", 285 robusta, Hk. f. ", 489 Wightiana, Wight ", 284 Roxburghiana, Benth. i. 487, 674 Wightiana, Wall ", 284 Roxburghiana, Benth. i. 487, 674 triphylla, DC ", 488 ferox, Salisb ", 115 triphylla, DC ", 488 ferox, Planch ", 115 viticina, Wall ", 489 indica, Planch ", 115 Evolvulus, Linn iv. 220	trichocarpa, Korth	. ,,	285	1 2000000000000000000000000000000000000
vitiensis, A. Gray "284 meliæfolia, Benth. "490 Wallichiana, Planch. "285 pedunculosa, Hk. f. "489 Wallichiana, Stend. "285 robusta, Hk. f. "488 Wightiana, Wight "284 Roxburghiana, Benth. 1487, 674 Wightiana, Wall. "284 rutæcarpa, Hk. f. & T. 1490 Euryale, Salisb. "115 triphylla, DC. "488 ferox, Salisb. "115 triphylla, Bedd. "489 ferox, Planch. "115 viticina, Wall. "489 indica, Planch. "115 Evolvulus, Linn. iv. 220	trichogyna, Bl	. ,,		,
Wallichiana, Planch. , 285 pedunculosa, Hk. f. , 489 Wallichiana, Steud. , 285 robusta, Hk. f. , 488 Wightiana, Wight , 284 Roxburghiana, Benth. i. 487, 674 Wightiana, Wall. , 284 rutsecarpa, Hk. f. & T. i. 490 Euryale, Salisb. , 115 triphylla, DC. , 487 ferox, Planch. , 115 viticina, Wall. , 489 indica, Planch. , 115 Evolvulus, Linn. iv. 220	tristyla, W. & A	. ,,		1
Wallichiana, Steud. " 285 robusta, Hk. f. " 488 Wightiana, Wight " 284 Roxburghiana, Benth. i. 487, 674 Wightiana, Wall. " 284 rutwearpa, Hk. f. g. T. … i. 490 Euryale, Salisb. . " 115 triphylla, DC. … " 488 ferox, Planch " 115 viticina, Wall. … " 489 indica, Planch " 115 Evolvulus, Linn. … . iv. 220	vitiensis, A. Gray	. ,,		
Wightiana, Wight " 284 Roxburghiana, Benth. i. 487, 674 Wightiana, Wall. " 284 rutsecarpa, Hk. f. & T i. 490 Euryale, Salisb. i. 115 triphylla, DC , 488 ferox, Salisb. " 115 triphylla, Bedd , 487 ferox, Planch. " 115 viticina, Wall , 489 indica, Planch. " 115 Evolvulus, Linn iv. 220		. ,,		
Wightiana, Wall. ", 284 rutsecarpa, Hk. f. & T i. 490 Euryale, Salisb. i. 115 triphylla, DC , 488 ferox, Salisb. ", 115 triphylla, Bedd , 487 ferox, Planch. ", 115 viticina, Wall , 489 indica, Planch. ", 115 Evolvulus, Linn iv. 220	Wallichiana, Steud	,,		1 200 400 11 11 11 11 11
Wightiana, Wall. ", 284" rutescarpa, Hr. J. & T. 1. 190 Euryale, Salisb. i. 115 triphylla, DC. ", 488 ferox, Salisb. ", 115 triphylla, Bedd. ", 487 ferox, Planch. ", 115 viticina, Wall. ", 489 indica, Planch. ", 115 Evolvulus, Linn. iv. 220	Wightiana, Wight	,,	==:	
Euryale, Salisb. i. 115 triphylla, DC. , 485 ferox, Salisb. , 115 triphylla, Bedd. , 487 ferox, Planch. , 115 viticins, Wall. , 489 indica, Planch. , 115 Evolvulus, Linn. iv. 220	Wightiana, Wall	"		1
ferox, Planch, 115 viticina, Wall, 489 indica, Planch, 115 Evolvulus, Linn	Euryale, Salisb	i.		1
indica, Planch iv. 220		,,		1 11-2 11-3 11-3 11-3
7,50,500, 1 10,000, 11,000		,,		1 - 120.000
Eurycoma, Jack 1. 521 alsinoides, Linn ,, 220				1 1 - 13 - 7 1
	Eurycoma, Jack	i.	521	aisinoides, Linn ,, 220

Evolvulus	Vol. Pa	ge l	Exacum	Vol. I	Page
alsinoides, Wall		24	zeylanicum, Wall	iv.	97
angustifolius, Roxb		.'O	sp., Griff	"	95
emarginatus, Burm		66	Excœcaria, Linn	v.	472
ferrugineus, Wall		18	acerifolia, F. Didr	,,	473
hederaceus, Burm		19	affinis, Endl	"	472
hirsutus, Lamk		20	affinis, Griff	"	470
linifolius, Linn	0	20	Agallocha, Linn	"	472
nummularius, Linn		34	baccata, Muell	"	470
pilosus, Roxb	,,	18	Camettia, Willd	"	472
sericeus, Wall	// 9	20	Chamælea, Baill		475
tridentatus, Linn	" 9/	05	cochinchinensis, Muell	"	473
Exace	,, –	94	crenulata, Wight		473
Exacum, Linn		95	discolor, Muell	"	469
alatum, Roth	14	04	7 * I * M11	"	473
atropurpureum, Bedd.	,,, -	97	1 1 1 11 12	"	473
!!! ///!		96		"	471
Beddomei, Clarke	"	97	tana and a 10 and a	"	472
7 17 77	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	95	f . 1: Cl	11	474
	··· "	96	0 1 1 1 17	,,	174
	"	98		473,	
carinatum, Roxb	···· "	95			474
chironioides, Griseb.	" 16	00	quadrangularis, Muell	₹.	473
P concinnum, Miq	"	97	rectinervis, Kurz	"	474
courtallense, Arn	7 1/		robusta, Hk f	,,,	
diffusum, Willd	1/	03		239,	
erectum, Roth		03	virgata, Zoll. & Moritz	v.	471
foliosum, Griseb	iv. 96, 9		<i>sp.</i>	"	475
grandiflorum, Wall		96	Exocarpus latifolia, Br	٧. ::	232
Hamiltonii, G. Don	" 16	95 04	Ewyckia capitellata, Walp.	11.	551
heteroclitum, Willd	"	95	cyanea, Bl	**	5 51 551
Horsfieldianum, Miq,	" 10	01	Jackiana, Walp	"	551
hyssopifolium, Willd. Lawii, Clarke	"	98	latifolia, Bl medinilliformis, Naud	"	551
	···· ." ~ č	97		"	551
macranthum, Arn		98	paniculata, Miq tuberculata, Korth	"	553
macrantherum, Miq.		96	tuberculata, Korth	"	000
Metzianum, Hohen. ovale, Griseb	··· "	96	Fagara ? Budrunga, Roxb.	j.	495
pedunculare, Arn	"	98	Lunur-ankenda, Gærtn		487
pedunculatum, Linn.	~ " ~	97	n n . '	,,	495
Perrottetii, Griseb	,,	95	A	,,	488
matialama (luisah	" "	98	4	"	487
pteranthum, Wall:	"	99	Fagonia, Linn	;, i.	425
pumilum, Griseb	"	98	arabica, Linn		425
punctatum, Linn. f.	··· " (99	Bruguieri, DC	"	425
rivulare, Edgew		98	cretica, Linn	"	425
sessile, Linn		98	Echinella, Boiss	"	425
sessile, Clarke	••	98	montana, Miq i. 42	. ":	
stylosum, Wall		95	mysorensis, Roth	, <u>i.</u>	425
sulcatum, Clarke	,,	95	Fagopyrum, Gærtn	v.	54
sulcatum, Roxb		98	cymosum, Meissn		55
sulcatum, Wight		96	emarginatum, Meissn	"	55
teres, Wall		95	acarlantum Mamak	"	55
tetragonum, Roxb	,,	95	rotundatum, Bab	"	55
travancoricum, Bedd.	,,	97	tatarianm Courts	"	55
verticillatum, Willd.		01	triangulare, Meissn	"	55
Walkeri, Arn	,,	96	Fagræa, Thunb	iv.	82
Wightianum, Arn		97	appendiculata, Bl	,,	84
zeylanicum, Roxb	iv. 97, 78	33	auricularia, Benth	"	83
•	•	•	•	,,	

Fagræa .		Vol	. Page	Ferula	V ol.	Page
auriculata, Jack .		is	. 83	fætidissima, Regl. & Schr	n. ii,	
Blumei, Steud		٠,,		Canach Laure T7 47	,,	708
carnoss, Jack		. ,,		Narthex, Boiss	"	707
celebica, Bl		. ,,		Thomsoni, Clarke	"	708
coarctata, Bl		٠,,			vii	. 348
coromandeliana, Wigh	16	, ,,	83	alpestris, Wulf	,,	353
crassifolia, Bl			83	altaina /Duin	,,	351
? crassifolia, Wall	•		83, 84	Amherstiana, Royle	., ,,	337
crassipes, Benth		. i▼.	-	aristata, C. Koch	,,	353
crenulata, Maingay	• •••	,,	83	aspera, Mert. & Koch .	,,	358
cuspidata, Bl		17	84	asthenica, Hk. f	,,	354
? dubia, Wall				barbata, Schrank	,,	35 3
fragans, Roab		iv.	_	? Basnia, Ham	,,	298
Gardneri, Thw	• •••	,,	84		,,	332
globosa, Wall		,,	83		,,	336
imperialis, Miq	• •••	,,	83		,,	33 2
khasiana, Benth		,,	84		,,	332
lanceolata, Wall	• •••	,,	85		. ,,	347
ligustrina, Bl	• •••	,,	85		. ,,	309
Maingayi, Clarke		,,	84		. ,,	308
malabarica, Bl	•••	"	83	Cumminsii, Stapf	. ,,	349
morindæfolia, Bl	•••	"	84	dactyloides, Roth	. ,,	308
obovata, Wall	•••	11	83	distans, Kunth	. ,,	347
obovato-javana, Bl	• • • •	11	83	dubia, Jacquem dura, Vill	. ,,	348
peregrina, Bl		"	85	dura, Vill	. ,,	335
racemosa, Jack	• • • •	"	84	duriuscula, Duthie	٠,,	351
robusta, Bl	•••	"	84	duriuscula, Hack	. 2-	348
Thwaitesii, F. Muell.	• • •	11	84	duriuscula, Hk. f. & T. vi		
volubilis, Jack	•••	"	84		. vii.	
Wallichiana, Benth.	•••	"	85	elatior, Str. & Wint		354
	<u>ښ</u>	,"	88	filiformis, Jacquem		348
Falcaria ? diversifolia, I		11.	681		i . 3 57	
Falconeria, Hk. f		iv.		filiformis, Steud	٠,,	287
himalaica, Hk. f	•••	"	319	fusca, Linn	٠,,	329
Falconeria, Royle	•••	v.	471	gigantea, Vill	٠,,	353
insignis, Royle	•••	"	471	gigantea, Griseb	٠,,	354
malabarica, Wight	•••	"	472	glaucescens, Roth		308
Wallichiana, Royle	•••	??	471	glomerata, All	. ,,	335
Farnesia odora, Gaspar. Farsetia, Desv	•••	11.	292 140	gracilis, Moeuch		363
	•••	i.	140	heptantha, C. Koch		337
ægyptiacs, Turr Edgeworthii, Hk. f. & '	m	"	141	heterophylla, Hæuke		353
Hamiltonii, Royle	1	"	140	heterophylla, Lumk		351
Jacquemontii, Hk. f. &	· T.	"	140	hirsuta, Fl. Dan indica, Retz		35 3 329
linearis, Done		"	140	in annuia IVO	•••	357
longisiliqua, Done	•••	"	140	back-inions (4		351
3 75	•••	"	141	Vitaibaliana Cabult		353
Fatioa nepaulensis, Wall.	•••	ïi.	575	Intefalia Doch		332
Fedia grandiflora, Wall.	• •••	iii.	211	1	"	354
Fergusonia, Hk. f	•••	iii.	48	T 04		352
zeylanica, Hk. f			48	Laurani Massal	"	357
Feronia, Gartn	•••	ï.	516	1 1 1 0 . TY		353
Elephantum, Correa	•••	"	516	lugido Otané		3 55
pellucida, Roth	•••		517	maritima, Linn	•••	356
Ferreola buzifolia, Roxb.	•••	iïi.	551	modesta, Steud		354
Ferula, Linn	•••	ii.	707	mucronata, Forsk	••	334
Asafætida, Boiss	•••	"	708	mutica, Jacq	••	355
	•••	"			"	

Festuca	Vol.	Page	Ficus	▼	ol, F	'age
mysorensis, Heyne		284	acuminata, Hook			498
mysurensis, Heyne	. ,,	257	acuminata, Kth. & Bouc	hé	,, (520
Myuros, Linn		343	acuminata, Roxb			497
natans, Ham		321				496
	. 351	, 353	mandifala Mia			519
nigricans, Schleich	. vii.	351	_ J1 M:			528
nitidula, Stapf		350	n.J.,			527
Povina, Griseb		351			,, (518
ovina, Host	•••	348	-AC VIVI-11			511
ovina, Linn	•••	348	albu Daiman			530
parviflora, Hack		348	-1-16-11- Min			527
persica, C. Koch		337	307.13			586
phleoides, Vill		809	Alle and the Deal			497
pinnata, Moench		363	-1.1			504
poæformis, Pers		357	-1-4 D1			527
poæoides, Thuill		357	A 17		••	497
polycolea, Stapf	•••	349			"	515
polygama, C. Koch		337	377.11		"	519
Pseudomyuros, Soyer	• • •	856	1 30.		"	497
387211.3		353	1 1 20.		••	497
Dallie	•••	350	amaulidana Mia		" '	520
		334	angunaens, Miq angustifolia)	DI	"	520
II L. II		353			"	506
and the trade of the second		329			"	502
and a Time		352			"	537
rubra, Linn		330			"	
scaberrima, Nees		358		•••	••	531
scaberima, Steud				•••	"	518
scabrella, Torr	. ,,	352	77'	•••		518
sibirica, Hack		35 5		•••		529
speciosa, Schreb	. ,,	857		•••	,,	581
stricta, Royle	. ,,	348		•••		518
sylvatica, Huds	. ,,	368		••• ;	••	517
tenuiflora, Schrad	٠٠ (١١)	856		•: , 1		501
tenuis, Ham	. ,,	298	asperiuscula, Kth. & Bou	obė,		521
triflora, 8m	. ,,	858		1	,, .	22
undata, Stapf	. ,,	350	assamic a, Miq		·· .	519
Puniglumis, Griseb	. ,,	356		٠.,	,,	517
uniglumis, Soland	. ,,	856	aurantiaca, Miq	,		532
valesiaca, Schleich	. ,,	348		,	,,	506
virgata, Heyne	. ,,	332	aurata, Miq	,	,,	81
Wightiana, Steud		358	P barbata, Wall	,	,, E	529
sp., Hk. f. & T vii			Beddomei, King		,, 5	602
	vii.		bengalensis, $Linn.$,	,, 4	199
sp., Wall vii. 340	, 344,	363	Benjamina, $Linn.$			803
FESTUCACEE	7ii. 7,	300	Benjamına, Wall			115
Fibichia umbellata, Koel	vii.	289	Daniamia - 387:33 d	٠ ,	, 8	511
Fibraures, Lour	. i.	97	bhotanica, King			19
chloroleuca, Miers		98	history July Di			19
fasciculata, Miers		98	Links deless Miss			19
tinctoria, Lour	-	98	1	,		36
Phæmatocarpa, Hk. f. & T.		106	1. 54 337 11		•	34.
Ficaria glacialis, Fisch	•	21	0 1.1.1	•		606
FICOIDE	••	658	borneensis (vide Pogono		•	
Ficus, Linn		494	tromba)		. 5	27
abbreviata, Wall		536	h	•• ,	່ ຮ	01
Abelii, Miq		538	Lucius and Miles		, i	21
acamptophylla, Miq		507	11: 16:	-		18
	"			,	, .	

Fiou s	Vol.	. Page	Fi þ us	1	Vol. I	ege.
callosa, Willd		516	liversifolis, Bl			529
caloneura, Kurz		537	liversiformis, Miq			526
Carica, Linn	•••	530	dives, Miq	• • •	"	529
caricoides, Roxb		530	dubia, Wall		"	509
caudata, Hk. f. & T		521	elastica, Rowb		"	508
caudata, Wall		521	elongata, Miq		"	519
caudiculata, Trim		510	Emodi, Wall		"	526
caulocarpa, Miq v		1, 524	erecta, 7 hunb	•••	"	532
celebica, Bl			erecta, Miq	•••	"	528
cerasiformis, Desv		498	? euphylla, Kurz	•••	,,	509
cerifera, Bl		535	? exasperata, Roxb	•••	"	496
ceriflua, Jungh		535	excavata, King	•••	,,	526
ceylanica, Miq	• • • • • • • • • • • • • • • • • • • •	526	excelsa, Vahl		"	497
Championi, Benth	••	517	excelsa, Wall	•••	,,	497
chartaces, Wall	• • • • • • • • • • • • • • • • • • • •	533	fallar, Mig		"	520
Chincha, Roxb	•••	521	fasciculata, King		"	524
chittagonga, Miq	•	536	Fieldingii, Miq		"	534
chlorocarpa, Benth		535	Finlaysoniana, Wall.		"	538
chlorocarpa, Miq	• • • • • • • • • • • • • • • • • • • •	531	firma, Wall	•••	"	503
chrysocarpa, Reinw		201	fistulosa, Reinw	•••	"	525
-1 D1	•	501	fistulosa, Kurz	•••	"	524
		537	flavescens, Bl	•••	"	502
cinerascens, Thw	•	517	foveolata, Wall	•••	"	528
citrifolia, Willd	• • • • • • • • • • • • • • • • • • • •	500	fraterna, Miq	•••	"	506
Olambai Timm	••	536	fruticosa, Roxb	•••	"	526
clavata, Wall		520	fulva, Reinw			531
	•••	508	gemella, Wall	•••	"	534
	• • • • • • • • • • • • • • • • • • • •	400	geminifolia, Miq		"	525
						516
congesta, Roxb	• • • • • • • • • • • • • • • • • • • •	537 522	geniculata, Kurz	v.	496.	
conglobata, King	. "	522	gibbosa, Bl	V.	496,	497
conglobata, King conglomerata, Roxb	. "	522 523	gibbosa, Bl glabella, Bl	٧. 	496, ▼.	497 511
conglobata, King conglomerata, Roxb consociata, Bl	· "	522 523 505	gibbosa, $Bl.$ glabella, $Bl.$ glaberrima, $Bl.$	v. 	496, ▼. "	497 511 506
conglobata, King conglomerata, Roxb	. 52	522 523 505 4, 537	gibbosa, Bl glabella, Bl glaberrima, Bl glandulifera, Wall	v.	496, ▼. "	497 511 506 532
conglobata, King consociata, Bl copiosa, Stend vcordifolia, Roxb	. ,, . ,, r. 52•	522 523 505 4, 537 . 513	gibbosa, $Bl.$ glabella, $Bl.$ glaberrima, $Bl.$ glandulifera, $Wall.$ globosa, $Bl.$	v.	496, ▼. ,,	497 511 506 532 503
conglobata, King	. ", . ", . 52.	522 523 505 4,537 . 513 521	gibbosa, $Bl.$ glabella, $Bl.$ glaberrima, $Bl.$ glandulifera, $Wall.$ globosa, $Bl.$ glomerata, $Roxb.$	v.	496, ▼. " "	497 511 506 532 503 535
conglobata, King conglomerata, Roxb. consociata, Bl copiosa, Stend cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl	· ,, · ,, · , 52·	522 523 505 4, 537 . 513 521 500	gibbosa, Bl glabella, Bl glaberrima, Bl globosa, Bl glomerata, Roxb Gonia, Ham	v.	496, ▼. ,, ,,	497 511 506 532 503 535 500
conglobata, King	· ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	522 523 505 4,537 . 513 521 500 529	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glandulifera, Wall globosa, Bl. glomerata, Roxb Gonia, Ham Goolereea, Roxb	v.	496, ▼. ., ., .,	497 511 506 532 503 535 500 536
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniafolia, Vahl crininervis, Miq. crustacea, Wall.	· ,, · ,, · , 52	522 523 505 4,537 513 521 500 529 526	gibbosa, Bl glabella, Bl glaberrima, Bl glandulifera, Wall globosa, Bl glomerata, Roxb Gonia, Ham Goolereea, Roxb gessypina, Wall	v.	496, ▼. 	497 511 506 532 503 535 500 536 530
conglobata, King conglomerata, Roxb. consociata, Bl cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervia, Miq. crustacea, Wall. cuneata. Wall.	· · · · · · · · · · · · · · · · · · ·	522 523 505 4,537 513 521 500 529 526 537	gibbosa, Bl glabella, Bl glaberrima, Bl globosa, Bl glomerata, Roxb Gonia, Ham Goolereea, Roxb gessypina, Wall ? gracillis, Wall	v.	496, v.	497 511 506 532 503 535 500 536 580 537
conglobata, King conglomerata, Roxb. consociata, Bl. coriosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniafolia, Vahl crininervia, Miq. crustacea, Wall. cuneata, Wall.	· · · · · · · · · · · · · · · · · · ·	522 523 505 4,537 513 521 500 529 526 537 497	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glandulifera, Wall globosa, Bl. glomerata, Roxb Gonia, Ham Goolereea, Roxb gcssypina, Wall ? gracillis, Wall	v.	496, ▼. 	497 511 506 532 503 535 500 536 530
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniafolia, Vahl crininervia, Miq. crustacea, Wall. cuneata, Wall. cuneata, Bl. Cunia, Ham.	· · · · · · · · · · · · · · · · · · ·	522 523 505 4, 537 513 521 500 529 526 537 497 523	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gessypina, Wall. grandifolia, Wall. grandifolia, Wall. grandifolia, Wall. grewiæfolia (grewiæfo	v. 	496, v	497 511 506 532 503 535 500 536 530 537 498
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Steud. cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Wall. cuneata, Bl. Cunis, Ham. cuspidata, Reinw.	· · · · · · · · · · · · · · · · · · ·	522 523 505 4, 537 513 521 500 529 526 537 497 523 520	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gcssypina, Wall. gracillis, Wall. grandifolia, Wall. grewiæfolia (grewiæfo	v. 	496, v	497 511 506 532 503 535 500 536 530 537 498
conglobata, King conglomerata, Roxb. consociata, Bl. coriosa, Stend. corodifolia, Roxb. coronata, Reinw. cotoniafolia, Vahl crininervia, Miq. crustacea, Wall. cuneata, Bl. Cunia, Ham. cuspidata, Reinw. cuspidata, Reinw. cuspidifera, Miq.	· · · · · · · · · · · · · · · · · · ·	522 523 505 4, 537 513 529 526 537 497 523 520 497	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gcssypina, Wall. gracillia, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol	v. 	496, ▼. 	497 511 506 532 503 535 500 536 530 537 498
conglobata, King conglomerata, Roxb. consociata, Bl. coronata, Reinw. coronata, Reinw. cotoniafolia, Vahl crininervia, Miq. crustacea, Wall. cuneata, Bl. Cuneata, Bl. Cunia, Ham. cuspidata, Reinw. cuspidifera, Miq. cyrtophylla, Wall.	· · · · · · · · · · · · · · · · · · ·	522 523 505 4, 537 513 521 500 529 526 537 497 523 520 497	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gessypina, Wall. ? gracillis, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl grewiæfolia, Ht. Berol grisea, Wall.	v	496, v	497 511 506 532 503 535 500 536 530 537 498 496 521 537
conglobata, King conglomerata, Roxb. consociata, Bl. corosa, Stend. corodifolia, Roxb. coronata, Reinw. cotoniafolia, Vahl crininervia, Miq. crustacea, Wall. cuneata, Bl. Cuneata, Bl. Cunia, Ham. cuspidata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kopn.	· · · · · · · · · · · · · · · · · · ·	522 523 505 4, 537 513 521 500 529 526 537 497 523 520 497 521 529	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glaberrima, Bl. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gessypina, Wall. ? gracillir, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossinervis, Miq.	v	496, v	497 511 506 532 503 535 500 536 530 537 498
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Steud. cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Bl. Cuneata, Bl. Cuneata, Bl. cuneata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kopn. Dalhousiæ, Miq.	7. 52°	522 523 505 4, 537 513 521 500 529 526 537 497 523 520 497 521 523 499	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gcssypina, Wall. ? gracillis, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossinervis, Miq. grossularioides, Burm.	v	496, v	497 511 506 532 503 535 500 536 530 537 498 496 521 537 529 519
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniafolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Wall. cuneata, Bl. Cunis, Ham cuspidata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kon. Dalhonsiæ, Miq. dasycaula (vide Covellis	· · · · · · · · · · · · · · · · · · ·	522 523 5537 513 521 500 529 529 523 520 497 521 523 499 521	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gracillis, Wall. grandifolia, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossularioides, Burm. grossularioides, Burm. guttata, Kurs	v	496, v	497 511 506 532 503 535 500 536 530 537 498 498 498 521 537 529 519
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. corodifolia, Roxb. coronata, Reinw. cotoniefolia, Vahl crininervia, Miq. crustacea, Wall. cuneata, Bl. Cunia, Ham. cuspidata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Koen. Dalhousiæ, Miq. dasycaula (vide Covellis deltoidea, Jack	· · · · · · · · · · · · · · · · · · ·	522 523 523 4, 537 513 521 529 526 537 497 523 497 521 523 499	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gracillia, Wall. grandifolia, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossinervia, Miq. grossularioides, Burm. guttata, Kurs. hænatocarpa, Bl.	v	496, v. 	497 511 506 532 503 535 500 536 530 537 498 498 521 537 529 519 534 508
conglobata, King conglomerata, Roxb. consociata, Bl	· · · · · · · · · · · · · · · · · · ·	522 523 523 4,537 513 521 500 529 526 537 497 523 520 497 521 523 499 521 529 534	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall globosa, Bl. glomerata, Roxb Gonia, Ham Goolereea, Roxb gessypina, Wall gracillir, Wall grandifolia, Wall grewiæfolia (grewiæfo Bl grewiæfolia, Ht. Berol grisea, Wall grossinervis, Miq grossularioides, Burm. guttata, Kurs hæmatocarpa, Bl Hamiltoniana, Wall.	v	496, v	497 511 506 532 503 535 500 536 537 498 496 521 537 529 519 534 508 535
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Steud. cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Bl. Cuneata, Bl. Cuneata, Bl. cuneata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kon. Dalhousiæ, Miq. dasycaula (vide Covellis deltoidea, Jack densa, Miq. densiserra, Miq.	· · · · · · · · · · · · · · · · · · ·	522 523 523 4,537 513 521 529 526 637 497 523 520 497 523 520 497 521 523 520 521 523 521 523 521 523 521 521 523 521 521 523 521 521 522 523 521 521 521 522 523 523 521 521 521 521 522 523 523 521 521 521 522 523 523 524 525 527 527 528 529 529 529 529 521 521 521 521 521 522 523 523 524 525 527 527 528 529 529 529 529 521 521 521 521 521 521 521 521 521 521	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gcssypina, Wall. ? gracillis, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossinervis, Miq. grossinervis, Miq. grossularioides, Burm. guttata, Kurs hænatcorpa, Bl. Hamiltoniana, Wall. hapalophylla, Kurs	v	496, v	497 511 506 532 503 535 500 536 530 537 498 496 521 537 529 519 508 536 537
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Bl. Cuneata, Bl. Cuneata, Bl. Cunia, Ham. cuspidata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kon. Dalhonsiæ, Miq. dasycaula (vide Covellis deltoidea, Jack. densa, Miq. densiserra, Miq. densiserra, Miq. denticulata, Vahl	· · · · · · · · · · · · · · · · · · ·	522 523 524, 537 521 529 526 537 497 523 497 521 523 499 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 523 524 523 523 524 523 524 523 524 525 526 527 528 529 529 529 529 529 529 529 529 529 529	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gcssypina, Wall. ? gracillis, Wall. grandifolia, Wall. grewiæfolia, Grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossularioides, Burm. guttata, Kurs hæmatocarpa, Bl. Hamiltoniana, Wall. hapalophylla, Kurs hederacea, Roxb.	v	496, v. n n n n n n n n n n n n n	497 511 506 532 535 500 536 537 498 496 521 537 529 519 508 508 508 508 508 508 508 509 509 509 509 509 509 509 509 509 509
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Steud. cordifolia, Roxb. coronata, Reinw. cotoniafolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Wall. cuneata, Bl. Cunia, Ham cuspidata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kon. Dalhonsiæ, Miq. dasycaula (vide Covellia deltoidea, Jack densa, Miq. densiserra, Miq. densiserra, Miq. denticulata, Vahl depressa, Bl.	· · · · · · · · · · · · · · · · · · ·	522 523 523 4, 537 521 529 526 537 497 523 497 523 497 521 523 499 521 529 529 521 529 521 529 521 529 521 520 521 521 522 523 523 523 523 523 523 523 523 523	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gracillia, Wall. grandifolia, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossinervis, Miq. grossilarioides, Burm. guttata, Kurs hæmatocarpa, Bl. Hamiltoniana, Wall. hapalophylla, Kurs hederacea, Rosb. heterophylla, Linn.	v	496, v	497 511 506 532 535 500 536 530 537 498 498 498 521 537 539 519 534 508 535 537 537 538 538 538 538 538 538 538 538 538 538
conglobata, King conglomerata, Roxb. consociata, Bl	· · · · · · · · · · · · · · · · · · ·	522 523 523 4, 537 513 521 500 529 526 537 497 523 520 497 521 529 521 529 534 531 531 502 534 531 531 531 531 531 531 531 531 531 531	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glaberrima, Bl. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gcssypina, Wall. ? gracillir, Wall. grandifolia, Wall. grewiæfolia (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossularioides, Burm. guttata, Kurs hæmatocarpa, Bl. Hamiltoniana, Wall. hapalophylla, Kurs hederacea, Roxb. heterophylla, Linn. hibiscifolia, Champ.	v	496, v	497 511 506 532 535 500 536 537 498 498 498 521 537 5519 534 508 536 537 5519 536 537 5519 538 538 539 539 539 539 539 539 539 539 539 539
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Bl. Cuneata, Bl. Cuneata, Bl. Cuneata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kon. Dalhousiæ, Miq. dasycaula (vide Covellis deltoidea, Jack denss, Miq. densiserra, Miq. densiserra, Miq. denticulata, Vahl depressa, Bl. dictyophylla, Wall.		522 523 523 4, 537 513 521 529 526 537 497 523 523 520 497 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 521 522 523 523 524 521 522 523 524 525 521 521 522 523 524 525 527 527 528 529 529 529 521 521 522 523 524 525 527 527 528 529 529 529 529 529 529 529 529 529 529	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gessypina, Wall. ? gracillis, Wall. grandifolia, Wall. grewiæfolia, (grewiæfo Bl grewiæfolia, Ht. Berol grisea, Wall. grossinervis, Miq. grossularioides, Burm. guttata, Kurs hæmatocarpa, Bl. Hamiltoniana, Wall. hapalophylla, Kurz hederacea, Roxb. heterophylla, Linn. hibiscifolia, Champ. hirsuta, Roxb	v	496, v	497 511 506 532 535 500 536 537 498 498 498 521 537 529 519 534 535 536 537 526 538 538 538 538 538 538 538 538 539 539 539 539 539 539 539 539 539 539
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Bl. Cunis, Ham. cuspidata, Reinw. cuspidata, Reinw. cuspidafera, Miq. cyrtophylla, Wall. Dæmonum, Kon. Dalhousiæ, Miq. dasycaula (vide Covellis deltoidea, Jack densiserra, Miq. densiserra, Miq. densiserra, Miq. denticulata, Vahl depressa, Bl. dictyophylla, Wall. dilatata, Miq. dilatata, Miq.		522 523 524, 537 521 529 526 537 497 523 497 521 523 499 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 521 523 524 523 524 523 524 525 526 527 528 529 529 521 521 522 523 524 524 525 526 527 528 528 529 521 521 522 523 524 524 525 526 527 528 528 529 521 521 522 523 524 524 525 526 527 528 528 529 529 521 521 521 521 521 522 523 524 525 526 527 527 528 528 529 529 529 529 529 529 529 529 529 529	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gcssypina, Wall. ? gracilli, Wall. grandifolia, Wall. grewiæfolia, (grewiæfo Bl. grewiæfolia, Ht. Berol grisea, Wall. grossinervis, Miq. grossularioides, Burm. guttata, Kurs hæmatocarpa, Bl. Hamiltoniana, Wall. hapalophylla, Kurs hederacea, Roxb. heterophylla, Linn. hibiscifolia, Champ. hirsuta. Roxb. hirta, Vahl	v	496, v	497 511 506 532 503 535 536 537 498 496 521 537 5219 534 508 535 537 526 537 536 537 538 539 539 539 539 539 539 539 539 539 539
conglobata, King conglomerata, Roxb. consociata, Bl. copiosa, Stend. cordifolia, Roxb. coronata, Reinw. cotoniæfolia, Vahl crininervis, Miq. crustacea, Wall. cuneata, Bl. Cuneata, Bl. Cuneata, Bl. Cunis, Ham. cuspidata, Reinw. cuspidifera, Miq. cyrtophylla, Wall. Dæmonum, Kon. Dalhoneiæ, Miq. dasycaula (vide Covellis deltoidea, Jack. densa, Miq. densiserra, Miq. densidata, Vahl dilatata, Miq. f dimidiata, Wall. diphylla, Wall.		522 523 523 4, 537 521 529 526 537 497 523 497 521 529 521 529 521 529 521 529 521 529 521 529 521 529 521 521 529 521 521 529 521 521 522 523 523 521 521 522 523 523 524 525 526 527 528 529 529 529 529 529 529 529 529 529 529	gibbosa, Bl. glabella, Bl. glaberrima, Bl. glaberrima, Bl. glandulifera, Wall. globosa, Bl. glomerata, Roxb. Gonia, Ham. Goolereea, Roxb. gessypina, Wall. ? gracillis, Wall. grandifolia, Wall. grewiæfolia, (grewiæfo Bl grewiæfolia, Ht. Berol grisea, Wall. grossinervis, Miq. grossularioides, Burm. guttata, Kurs hæmatocarpa, Bl. Hamiltoniana, Wall. hapalophylla, Kurz hederacea, Roxb. heterophylla, Linn. hibiscifolia, Champ. hirsuta, Roxb	v	496, v	497 511 506 532 535 500 536 537 498 498 498 521 537 529 519 534 535 536 537 526 538 538 538 538 538 538 538 538 539 539 539 539 539 539 539 539 539 539

T			_ 3	1 12		
Ficus			Pijce	Ficus	Vol.	
Hookeri, Miq	•••	٧.	5,15	? montana, Burm		519
humilis, Roxb	•••	"	54.9	montana, Wall	÷ "	512
Hunteri, Miq	•••		510	Mooniana, King	. ,,	514
hypsophila, Miq	▼. 4		521	mysorensis, Heyne	• ,,	500
ich nopoda, Miq	• • •	٧.	533	neglecta, Bl	. ,,	508
impressa, Benth		"	528	nemoralis, Wall	22	534
incisa, Wall		,,	537	nervosa, Roth	. ,,	512
inclinata, Ham		"	537	nigrescens, King	. ,,	520
inclinata, Ham	•••	,,	525	nipponica, Fr. & Sav	. ,,	528
inconstans, Miq		,,	519	nitida, Thunb	. ,,	511
indica, Linn		,,	506	nivea, Bl	• ,,	530
indica, Linn	v. 4	199,	500	nuda, Kurz	. ,,	537
infectoria, Roxb		v.	515	nuda, Miq		5 08
infectoria, Willd		,,	514	obpyramidata, King	. ,,	525
insignis, Kurz		"	515	obscura, Bl		521
japonica, Bl		,,	532	obtecta, Wall		529
Junghuhniana, Miq.		,,	498	obtusa, Hassk		527
Kurzii, King		,,	509	obtusidens, Miq		52 0
laccifera, Roxb		,,	504	obtusifolia, Roxb	• • • • • • • • • • • • • • • • • • • •	507
Lucor, Ham			516	oliyodon, Miq	•••	535
lævis, Bl		"	526	oligosperma, Miq		528
Lambertiana, Miq		"	516	onusta, Wall	••	503
laminosa, Hardw		"	523	oppositifolia, Willd		522
7 36	•••	"	522	ovoidea, Jack	. 529,	
1 1 17	•••	"	536	oxycoccoides, Linn		526
	•••	"	499	777		530
lancifolia, Miq laniyera, Wall	•••	"	529	1 1 1 1 1	••	530
langera, Wall	•••	"	500	? palmata, Roxb		508
lateritia, Wall	•••	"		papyrifera, Griff		497
lepicarpa, Bl	•••	"	525	paradoxa, Bl		497
lepidosa, Wall	•••	"	522	parasitica, Koen		498
leptocarpa, Steud	•••	"	528	parietalis, Bl	٠,,	511
leucoxylon, Miq.	•••	"	496	parvifolia, Miq	. ,,	
littoralis, Bl	•••	"	511	? pedicellata, Wall		526
Lobbii, Miq	٠	"	520	pellucido-punctata, Griff	• ,,	506
longifolia, Ham			508	pendula, Link	. ,,	508
Lowii, King	•••	٧.	504	pervia, Miq	. ,,	497
lucescens, Bl	•••	,,	516	phlebophylla, Miq	. ,,	498
ludens, Wall	• • • •	"	528	pilosa, Reinw	. ,,	500
luducca, Roxb	• • •	,,	528	piperifolia, Miq	. ,,	527
lutescens, Desf	v. 5	29,	530	pisifera, Wall	. ,,	496
Maclellandi, King		V.	512	pisocarpa, $Bl.$. ,,	510
macrocarpa, Wight	•••	,,	534	platycaula, Miq	٠,,	527
macrophylla, Roxb	•••	"	534	politoria, Moon	. ,,	522
macropoda, Kurz	•••	,,	537	polycarpa, Roxb	. ,,	524
magnoliæfolia, Bl	•••	,,	512	pomifera, Wall	. ,,	535
Mappan, Miq	•••	"	530	pomifera, Kurz	· ,,	518
martabanica, Wall		,,	522	populifolia, Wall	. ,,	513
microcarpa, Bl	•••	,,	528	procera, Bi	. ,,	505
microcarpa, Linn. f.		,,	511	prominens, Wall		528
microstoma, Wall		,,	506	prostrata, Wall		523
microtus, Miq		"	496	prostrata, Wall	••	524
Millettii, Mig		"	533	pruniformis, Bl	•	502
Miquelii, King		"	524	Pseudo-sycamorus, Done.	,,,	530
modesta, Miq		"	512	pubescens, Roth		500
mollis, Miq	•••	"	536	pubijera, Kurz	•	537
mollis, Vahl	•••	"	501	pubigera, Wall	• •	528
mollis, Willd			523	? pulchra, Wall	•	537
	•••	"		Farming train	. ,,	

				}		
Ficus	٧o	1. 1	Page	Figus	Vol.	
pumila, Thunb	v	•	532	silbetensis, Miq	. v.	533
punctata, Thunb	,	,	517	sinuosa, Miq	,,,	519
punctata, Heyne		,	516	Spanogheana, Miq	, ,,	527
P pyrifolia, Burm		,	532	spathulata, Miq	. ,,	529
pyriformis, Hk. & Arn.		,,	583	squamosa, Roxb	,,	523
pyrrhocarpa, Kurz		,,	523	stipulata, Moon	"	526
quercifolia, Roxb		,,	519	stipulata, Wall	,,,	518
quercifolia, Bl		"	520	? striata, Roth		508
racemifera, Roxb		,,	535	strigosa, Bl	. ,,	527
racemosa, Wall		"	536	subdenticulata, Miq	. ,,	521
radicans, Roxb		,,	520	subobliqua, Miq	. ,,	497
ramea, Wall		,,	537	subupaca, Miq		535
ramentacea, Roxb		,, ,,	528	suborbicularis, Miq	. ,,	531
raridens, Miq		,,	520	subpanduræformis, Miq		519
recurva, Bl			527	subpedunculata, Miq		511
Reemblas, Miq		"	521	subpyriformis, Miq		53 3
	v. 5	34.		subracemosa, Bl		535
regia, Miq Reinwardtii, Link &	_	٧.	531	subrepanda, Wall v	. 500	, 537
religiosa, Linn			513	? subrigida, Miq	_	528
		"	518	subulata, Bl		497
repens, Ham		"	518	sundaica, Bl		506
7		"	497	sycomoroides, Miq		535
		"	511	Tabing, Miq		498
retusa, Linn		"	510	Tadjam, Miq		496
rhododendrifolia, Mig	-	"	524	Talboti, King		512
Ribos, Reinw	•••	"	527	tengerensis, Miq		525
ribesioides, Wall		"	528	tenuiramis, Kth. & Bouch		520
rigescens, Miq		"	505	terminalioides, Griff	. ,,	516
rigida, <i>Miq</i>		"	497	tetangis (tetrargys), Miq		518
rigida, Bl		"	516	Teysmanniana, Miq.		527
rigida, Ham rostrata, Lamk		,,	520	Thomsoni, Mig		506
		"	537	Thunbergii, Maxim		528
		"	534	Thwaitesii, Miq		5 25
Roxburghii, Wall Roxburghii, Miq		"	5 32	Tjakela, Burm	• • •	514
		"	506	m 1 337 11	,,	515
1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		"	519	1 20 1	,,	500
mulum Dash		"	511	l . ' ' . n	"	501
		"	518	tomentosa, Herb. Madr		500
0		,,	518		"	496
rufipila, Miq		"	498	1 . 1 317.11	"	533
Rumphii, Bl		"	512	1	,,	521
rupestris, Ham		"	500	3.6	,,	517
sæmocarpa, Miq		"	523		,,	503
salicifolia, Miq		"	521	m 12 34'	,,	496
savatilis, Bl		"	520	1	,,	534
saxatilis, Miq		"	496	1	,,	532
scabra, Jacq		"	523	1	,,	509
scabrella, Roxb		"	518		,,	526
scandens, Roxb		"	526		,,	507
sclerophylla, Roxb		"	497	1	,,	
scleroptera, Griff		"	534		۱۱ و.	518
scleroptera, Miq		"	516	1	,,	515
setifera, Steud		"	531	tuberculata, Roxb	,,	497
setosa, Bl		"	531	7 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	,,	
sideroxifolia, Griff		"	529		,,	
Sieboldi, Miq		"	532		,,	
sikkimensis, Miq		"	521	1 . 37.	,,	E 97
		"		•		

Ficus	Vol.	Page	Fimbristylis	Vol. 1	
urophylla, Wall	v.	4/8	biumbellulata, Boeck.	vi.	
4 Th	,,	5,7	Boeckeleri, Steud	vi. 644,	
vagans, Roxb	,,	526	brachyphylla, Schult.	vi.	636
	. ,,	528	brevifolia, Steud	,,	682
	,,	502	Buergueri, Miq	,,	689
1 1 101	. ,	535	capillacea, Steud	,,	652
	,,	532	capillaris, Benth	,,	652
TT7-11	11	517	capitata, Zoll	,,	640
A 24	,,	514	chetorrhiza, Kunth	,,	647
327 11	,,	· 515	chætorrhiza, Thw	vi. 643,	648
	. ,,	537	ciliolata, Steud	▼i.	
	,,	527	cincta, Nees	,,	636
!11 D1	,,	529	cinnamometorum, Hanc		649
	,,	497	cinnamometorum, Kunt		650
www.da Dowb	,,	530	comata, Nees	,,	635
volkhameriæfolia, Wall		525	communis, Kunth	vi. 636,	638
777 7 7 7	,,	511	complanata, Link	▼i.	646
TT7 7 4 1 (87 - 11	• • • • • • • • • • • • • • • • • • • •	516	complanata, Benth	,,	646
777 · 1411 Th 41	,,	528	compressa, Boeck	,,	639
1 1 19 707 77	,,	503	confinis, Steud	,,	639
Zollingeriana, Miq. (vie			connectens, Thw	,,	646
O 11!- \	•••	521	curvifolia, Steud	•••	636
	v. 513		cylindrocarpa, Kuuth	,,	631
Fieldia giguntea, Rchb. f		27	cyperoides, Br	** "	650
wan ri	iii		cyrtophylla, Miq	,,	639
9, 4, .		277	dasyphylla, Miq	,,	641
	,,	277	decora, Nees & Mey.	,,	641
		289	depauperata, Br	vi. 636	
		277	dichotoma, Vahl	vi.	·
	,,	277	dichotoma, Boeck	,,	637
73.11.1 . (71)	i.	539	digitata, Boeck	,,	648
A		539	diphylla, Vahl	,,	636
W2 1 7 1 1 7 1 7 1 7	vi		diphylla, Vahl		, 646
and the state of the state	,,	648	dipsacea, Benth	vi.	635
-1. Charles - Charles	,,	631	disticha, Boeck	11	651
7 7 m	,,	631	efoliata, Steud	*** 11	645
	,,	650	falcata, Boeck	,,	648
	,,	631	falcata, Kunth	,,	647
	,,	637	ferruginea, Vahl	,,	638
alleina an Marca	,,	641	ferruginea, Miq	404))	639
-11	,,	638	filifolia, Boeck	,,	643
1.1 11 (14	,,	645	filiformis, Kunth	*** "	63 3
77	,,	639	flaccida, Steud	,,	644
	,,	644	flaccidula, Zoll	,,	644
		637	foliosa, Link	,,	636
	v i	644	fulvescens, Thw	· · · · · · · ·	650
argentea, Vahl	ri. 590	3, 640	fusoa, Benth	,,	649
	v i	. 643	fuscinux, Clarke	,,	638
4 ALL! Mi	,,	631	Gambleana, Boeck	,,	651
arvensis, Vahl	,,	639	glabra, Steud		2, 650
	,,	643	glauca, Vahl	vi.	636
	,,	646	globulosa, Kunth	,,	644
1 1 D 1	,,	652	glomerata, Nees		640
benghalensis, R. & S.	,,	644	gracilis, Arn	,,	639
biflora, Boeck	,,	650	Griffithians, Steud.	,,	637
	,,	634	Griffithii, Boeck	,,	637
bispicata, Nees	,,	634	Hænkei, Dietr	vi. 647	7, 648
			· ·		

Fimbristylis	37-1	B	Fmbristylis		Wal.	Dogo
** * *** **		l. Page . 632	72		vi.	Page 636
**		610	1 km is 22 27 12			646
	••• ,:	000		·· ···	"	644
	,	641			"	645
	,				"	
	,				"	637
insignis, Thw	••• ,			•• ···	"	646
juponica, Sieb. & Zucc.	,		l		"	634
	,,			•••	"	641
juncea, R. & S	,			•••	"	632
junciformis, Kunth	,				"	636
junciformis, Munro	,	, 640			,,	636
Kamphæveneri, Boock.	,				11	640
Kingii, Clarke	,	, 63 3	spirostachys, F. Mue	11	"	637
Kraussiana, Hochst.	,	, 646			"	635
lovissima, Steud	,	, 640	stolonifera, $Clarke$.		,,	637
latifolia, Kunth	,	648	aubapicata, Nees &	Meyen	,,	634
laza, Vahl	,	636	sub-hulbosa, Boeck.	∀i.	632	, 633
leptoclada, Benth	,	6:47	subtetrastachya, Boe	ck	٧i.	618
littoralis, Gaud	,	6111	subtrabeculata, Clas	rke	,,	633
longispica, Stewl	,	gga			,,	642
malaccana, Boeck	,	632	tenera, Boeck v		646.	651
marginata, Labill	,	620				632
merguensis, Clarke		649			"	639
Metzii, Steud		696			"	642
microcarpa, F. Muell.		GIG			366	, 631
miliacea, Vahl	,	GAA				
? mollis, Kunth		270	1		4,	645
monandra, F. Muell.		699			"	636
monandra, R. & S		6.59			"	615
monostachya, Hassk.	,	640		•••	"	648
monticola, Steud	,	610				637
muriculata, Benth	,	649		· · · · · · · · · · · · · · · · · · ·	,,	639
nigrobrunnea, Thu.	,	610				649
nutans, Vahl	,	E49			"	648
ochreata, Boeck	,	GOO.		. .	,,	645
ozalis, Nees	,	626			"	641
oxylepis, Steud	,	GAO				640
pallescens, Nees	,	COR	sp., Wall. vi. 604,	612,	635,	636,
pauciflora, Br	,	633	637, 638, 639, 640	642,	643	644.
paupercula, Boeck	,	617	645, 646, 647, 648,	649, 6	59.	•
pentaptera, Kunth	,	RAS	Fingerhuthia, Lehm.		vii,	306
pentastuchya, Boeck.	,	GUG	affghanica, Boiss.		,,	306
Pierotii, Miq	,	6.19	africana, Aitch.		,,	306
podocarpa, Nees	,	COO.	Finlaysonia, Wall.		i٧.	. 7
podocarpa, Munro	,	COD	obovata, Wall		,,	7
podocarpa, Nees	,	, 636	Firmiana, Marsil.		i.	359
polymorpha, Boeck	vi. 63	6, 638	colorula, Br		,,	360
polytrichoides, Vahl	vi		Fisquetia macrocarpa,		₹i.	484
pumila, Benth	,	, 633	militaris, Gaud		"	486
pycnostachya, Hance	,				,,	486
quinquangularis, Kunth		, 644	ovata, Gaud		"	487
retusa, Thw	,		Fissistigma scandens, C		i.	80
rigida, Kunth	,			· · · · · · · · · · · · · · · · · · ·	i.	191
rigidula, Nees	,		Cataphracta, Rozb.		,,	193
rigidula, Herb. Berol	,	, 640		• • • • • • • • • • • • • • • • • • • •	**	192
rigidula, Thw	••• ,		Cataphracta, Wall.		-	194
Roxburghii, Dietr	,	, 639	cordifolia, Roxb.	··· ···	"	194

Flacourtia	V ol.	P. 70	Flemingia	Vol.	Page
crenata, Wall	i.			. ii.	2 2 9
ferox, Wall	"	1[4		. ,,	227
inermis, Roxb	"	1 3		' "	230
inermis, Miq	,,	192		. ,,	230
inermis, Wall	,,	190		. ,,	229
Jangomas, Miq	"	193			229
mollis, Hk. f. & T	,,	192	Flemingia, Roxb. ex Rottl.		
montana, Grah	,,	192	grandiflora, Rottl. & Will	l. iv.	392
montana, Zipp	,,	192	Fleurya, $Gaud.$., v.	548
nivea, Moon	"	194	glomerata, Gaud	. ,,	549
obcordata, Roxb	,,	194	interrupta, Gaud	,,	548
? Perrottetiana, Clos	,,	19 3	spicata, Gaud	,,	5 49
P quintuplinervis, Turcz	,,	192	Floscopa, Lour	vi.	390
Ramontchi, L'Her	,,	193	Hamiltonii, Hassk	,,	390
Ramontchi, Wall	,,	193	Meyeniana, Hassk	,,	390
rotundifolia, Roxb	"	194		i. 382	, 390
Rukam, Zoll. & Mor	,,	192	TT1	vi.	3 90
sapida, Roxb	,,	193		,,	3 90
sapida, Wall	,,	191) 7 7 TT	,,	39 0
sepiaria, Rozb	,,	194	Flourensia cæspitosa, Cam		243
stigmarota, Wall	,,	190	Flueggea, vel Fluggea, Will		328
sumatrana, Planch	,,	192		,,	328
Wightiana, Wall	,,	194	1 777 41 77	,,	328
Flacourtiacea, Wall	i.	419	1 7 77 347 33	• ,,	328
FLACOURTIEE	i.	189		. "	328
Flagellaria, Linn	vi.	390	leucopyrus, Dalz. & Gibs		328
angustifolia, Wall	,,	391		. 1.	194
indica, Linn	"	3 91		▼.	305
minor, Bl	"	391	melanthesoides, F. Muell.	• ,,	328
FLAGELLARIEÆ	νi.	390		. ,,	328
Flemingia, Roxb. ex Ait	ii.	226	1 1	,,	328
abrupta, Wall	,,	227	111. (1 . ! 3 7) '77	. ,,	329
angustifolia, Roxb	,,	229	Daill	. ,,	328
bracteata, Wight	,,	227		,,	329
capitata, Ham	"	229	777 17 1 1 10 11	,,	329
capitata, Zolling		229	A T	•• ,,	329
Δ1 ' TT "	"	227	T 10. 1	. vi.	
chlorostachys, Wall	"	227	1 1 . D. L		268
congesta, Roxb	"	228	0 '04' 11' 11' 1		270
787-11	"	229	24	• • • • • • • • • • • • • • • • • • • •	269
fruticulosa, Wall	"	227			269
C1 1 177 Pa 4	"	228	landara Dial	••	267
	"	229	9		270
7 416 14 D	"	229	1 1/2 11 1 1 1 TZ 11.	•	268
1	"	228		. vi.	569
nana, Korb	"	229	l wa	. ii.	695
200 11	"	229	11 O DL		695
T27 - 77	"	227	l m i 1 A112.		695
	"	227	n	• • • • • • • • • • • • • • • • • • • •	695
	"	229	l u isa	• • • • • • • • • • • • • • • • • • • •	695
	"	230	1	,,	695
procumbens, Wight	"	229	i	. "	33
prostrata, Roxb	"	228			. = :
pycnantha, Benth	"	220			383 384
Rothiana, DC	"	220 2 2 9	Ø 100 1 11 01 1	. ,,	383
semialata, Boxb	"	229	Griffithii, Clarke		383
sericans, Kurz	"	229	l	. ,,	383
stricta, Rowb	"	440	hispida, Bot. Mag	. ,,	909

l'orrestia	Vol.	Page	Fr Ciliaria		Page
Hookeri, Hassk	Ţi.			vi.	352
marginata, Hassk	,,	383	mperialis, Linn	. ,,	353
mollis, Hassk		383	i macrophylla, D. Don .	,,	352
rostrata, Hassk		384	1 /	,,	352
	_	593			353
Forskahlea, Linn		59 3	73 1 1 77 7	••	353
latifolia, Retz	"		Grandine! 177. 4	,,	
tenacissima, Linn	,,	593		,,	353
urticoides, Wight	"	593		,,	352
Fothergilla involucrata, Falc.	ií.	426	? triceps (vide Lilium) .	,,	353
Fragaria, Linn	ii.	343	verticillata, Wall	,,	3 53
arguta, Lindl	,,	343	Fuirena, Rottb	vi.	665
		344	37-L1		666
D 14 ' 7 0'	"	345		• • • • • • • • • • • • • • • • • • • •	666
	"	344			666
elatior, W. & A	"			•••	665
indica, Andr	,,	343		,,	
indica, Wall	11	346		,,	666
malayana, Roxb	"	343	paniculata, Lam	,,	667
nilgerica, Zenker	,,	313		,,	667
nilgerrensis, Schldl		344	pubescens, Kunth	,,	665
nubicola, Lindl		344	1 N 1	,,	665
70 1 1 1 1 TOT 8 A		343	quinquangularis, Hassk		667
		345	70 (47 17 37	•••	666
sikkimensis, Kurz		-		,,	666
vesca, Linn		344		,,	
Francœuria erispa, Cass				,,	666
Frankenia, Linn	i.	212		,,	666
pulverulenta, Linn	,,	212		,,	667
FRANKENIACEÆ		211	Wallichiana, Kunth .	,	665
Franquevillea major, Zoll		279	sp., Wall vi. 66	5, 666,	. 667
FRAXINEE	•••		Fullartonia kumaonensi		
Fraxinus, Linn			DC ii	i. 332	671
		606			127
dimorpha, Coss. & Dur					128
excelsior, Linn	• • • • • • • • • • • • • • • • • • • •	606	parviflora, Lamk	. ,,	
floribunda, Wall	"	605	Vaillantii, Loisel		128
Griffithii, Clarke	,,	605		1.	120
heterophylla, Vahl	,,	606	Fussia caryophylla, Schur.	VII.	272
Moorcroftiana, Brand	, ,,	606			
Moorcroftiana, Wall		606	Gabertia scripta, Gaud	vi.	18
retusa, Champ		605		iv.	91
. 11 997 11		605	1	,,	91
	,,	606	Alleranda A. Mhan		91
xanthoxyloides, Wall				,,	92
	. ·i▼.			,,	92
indica, Dalz		76		,,	
Freycinetia, Gaud	vi.	487		,,	91
angustifolia, Bl	, ,,	487	Koenigii, Wight	,,	91
angustifolia, Kurz	,,,	487	laurifolia, Hb. Madr .	i.	419
Brunoniana, Wall		487	longifolia, Bojer	iv.	93
Debregeasiana, Gaud		487	obesa, Hk. f	,,	92
Gaudichaudii, Bennet		488	1	i.	418
		488	7) (1) 70 (iii.	
insignis, Bl		487			418
pvcnophylla, Solms					-
Walkeri, Solms		487		iv.	
Freziera? attenuata, Wall		290		,,	92
Fritillaria, Linn	vi.	352		,,	91
cirrhosa, D. Don		353	$\mathbf{viminea}, Hk. f. \dots \dots$,,	91
a ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '		054	: TET - 11 17/71 / A		92
Corona-imperialis. Garin.		354	walkeri, Wight	,,	
Corona-imperialis, Gærtu. Gardneriana, Wall	,,	354 353		iv.	79
Gardneriana, Wall Gulielmi-Waldemarii, Klot	,, ,,		GAERTNERIÆ	• • • • • • • • • • • • • • • • • • • •	

Gagea	Val.	Pace	Galega		₩-1	Do
amblyopetala, Boiss. & Heldr.	vi.	306	(7-1 4 TEF 113 3		ii.	Page 114
commutata, C. Koch		36	J. C. D. L.			113
elegans. Wall	"	345	Danie Barrie	•••	"	111
lutea, Schult. f	"	355	1. July 177	•••	"	113
Moorcroftiana, Wall	"	355	dunama Dank	•••	"	114
pedunculata, Wall	"	356	7	•••	"	112
namaiaa Daisa	"	355	manima Tima	•••	"	113
Paulchalla Wall	"	354		•••	"	112
motioninto Calada 6	"	356	TY.	•••	"	118
annumentary O Track	"	356	T	•••	"	112
A4/A/A-4- 363.3	"	856	andiana Time	•••	"	112
4	"	356		•••	. 27	
twint	"	856	sericea, Ham	· •••	"	112 112
	γi.	676	spinosa, Linn	•••	"	
	¥ 1.	676	tinctoria, Lamk	•••	"	112
A	iii.		villosa, Linn	•••	??	113
			GALEGRÆ	•••	ii.	57
calycoptera, J. & S		201	Galeola, Lour	,	▼i.	88
hymenostephana, J. & S.	"	202	altissima, Rchb. f	•••	"	89
	₹.	158	altissima? Rohb. f	•••	"	89
Galactia, P. Br	ii.	192	Cathcartii, Hk. f	•••	"	89
graminea, Heyne	"	192	Falconeri, Hk. f	•••	,,	88
Poxyphylla, Benth	"	192	Hydra, Rchb. f	•••	"	89
simplicifolia, Dalz	"	191	javanica, Benth	vi.		197
tenuiflora, W. & A	"	192	Lindleyana, Roth. f.	•••	vi.	88
tenuistora, Wall	"	192	? pusilla, Hk. f	•••	"	89
villosa, vv. a A	"	192	Galeopsis, Linn	•••	iv.	677
Galanga, Salisb	Ví.	253	Tetrabit, Linn	•••	"	667
	iii.	252	Galera nutans, Bl	•••	₹i.	124
juncea, Lindl	"	251	rosea, Bl	• • • •	"	124
Galearia, Zoll. & Moritz	v.	377	GALIEE	iii.		202
affinis, Br	"	379	Galinsoga, R. & P	•••	iii.	311
angustifolia. Miq	"	380	parviflora, Car	•••	. ??	311
elliptica, Miq	"	380	Galium, Linn	•••	iii.	204
fulva, Muell	"	878	acutum, Edgew	•••	"	208
Helferi, Hk. f	"	378	Aparine, Linn		.,,	205
Jackiana, Hk. f	"	378		iii.		
Lindleyana, Muell	"	379	asperifolium, Wall	•••	111.	207
Maingayi, Hk. f	"	377	asperuloides, Edgew.	•••	"	205
pedicellata, Hk. f	"	378	boreale, Linn	•••	99	205
phlebocarpa, Br	"	380 380	capillare, Cav	•••	"	208
splendens, Miq	17	879	ceratophylloides, Hk. f.		**	209
subulata, Muell	"	380	ciliatum, D. Don	•••	**	206
sumatrana, Miq Wallichii, Br	"	379	confertum, Royle	•••	,,	206
TOT-11:-1:: Tr	17	378	divaricatum, Lam	•••	"	208 204
O	"	242	elegans, Wall	•••	"	207
	v. ii.	240	exile, Hk. f floribundum, Jacq	•••	"	208
allindian Daul		243	VIT-11	•••	"	205
An Alice Van	"	240		•••	"	
	"	243	Hamiltoni, Spreng	•••	"	204 208
Distilla Dank	"	107	himalayense, Klotz	•••	"	206
	"	241	hirtiflorum, Req	•••	"	
Galega arborescens, Hb. Madr.	"	111	javanicum, Bl latifolium, Ham	•••	**	205 204
ammandan Lamba		113	11. (1. 🛣	•••	,,	20 1 207
Danie tout Danie	"	118	Mallman Time	•••	,,	207 207
O-1	"	112	paradoxum, Maxim.	•••	"	207 206
Colutea, Burm	"	95	parviflorum, D. Don	•••	"	200 207
	"		Party D. Dut	•••	"	

Galium	Vol.	Page	G: coinia	Vol.	Page
pauciflorum, Bunge	•••	205	vacrophylla, Anders.	i.	270
punduanum, Wall		204	daingayi, Hk. f	,,	267
Requienanum, W. & A		205	malabarica, Desr	iii.	556
rotundifolium, Linn	. ,,	204	malaccensis, Hk. f	i.	261
serpylloides, Royle		207	Mangostana, Linn	,,	260
setaceum, Lamk		208	merguensis, Wight	,,	267
spurium, Linn		208	Morella, Desr	i. 261,	264
stellariæfolium, Fr. & Sav	, ,,	206	nervosa, Miq	i.	715
tenuissimum, Bieb		209	uigro-liueata, Planch.	,,	268
tricorne, With	"	207	ovalifolia, Hk. f	,,	269
triflorum, Michr	. ,,	205	ozyphylla, Pl. & Tr	,,	263
vernum, Scop	. ,,	209	paniculata, Rozb	,,	266
verum, Linn	. ,,	208	Papilla, Wight	,,-	262
vestitum, D. Don		206	pedunculata, Rosb	,,	264
Gallesioa graveolens, Room		505	pictoria, Boxb	,,	264
pentaphylla, Rosm	. ,,	504	purpurea, Roxb	,,	261
Galumpita cuspidata, Bl	. ▼.	486	purpurea, Wall	,,	263
Gamblea, Clarke	. ii.	739	Romburghii, Wight	,,	262
ciliata, Clarke	. ,,	740	speciosa, Wall	i. 260	
Gamochilus, Lestib	. vi.	231	spectabilis, Hk. f	i.	261
Gamoplezis, Falc	. vi.	122	stipulata, Anders	,,	267
orobanchoides, Falc	. ,,	122	succifolia, Kurz	,,	270
Ganitrus sphærica, Gærtu		400	terpnophylla, Thw	,,	268
Ganosma inodora, Lour		88	travancorica, Bedd	,,	268
Garciana cochinchinensis			umbellifera, Roxb	,,	262
Lour		363	umbellifera, Wall	••• ,,	263
Garcinia, Linn	. i.	259	venulosa, Chois	1	260
acuminata, Pl. & Tr		264	Wallichii, Chois	i. 262	
affinis, Wall i	. 26 0,		Wightii, T. Anders	i.	26 5
affinis, W. & A	. i.	262	Xanthochymus, Hk. f.	,,	269
Andersoni, $Hk.f.$. ,,	270	seylanica, Roxb	,,	262
anomala, Pl. & Tr	. ,,	266	sp., Bedd	29	268
atro-viridis. Griff	. ,,	266	GARCINIEE	i.	259
bancana, Miq	. ,,	263	Gardenia, Linn	111.	115
Bhumicowa, Roxb	. ,,	266	? anisophylla, Wall.	,,	114
Cambogia, Desr	. ,,	261	arborea, Roxb	,,	116
cambogioides, Royle	. ,,	265	P Blumeana, DC	,,	118
celebica, Desr	. ,,	261	Burha, Ham	,,	39
celebica, Linn	**	260	nalyculata, Rozb	••• ,,	119
Choisyana, Wall	٠٠,,	265	campanulate, Roxl	*** ,,	118
conicarpa, Wight	• ,,	262	campanulata, Bl	*** ,,	118
cornes, Linn	. ,,	260	carinata, Wall	,,	117
Cows, Rosb	. ,,	262	P carinata, Griff	,,	117
echinocarpa, Thw		264	carinata, Thw	,,	120
	. 262,		coronaria, Ham	,,	117
engeniæfolia, Wall		268 045	costata, Roxb	,,	117
Gaudichaudi, Pl. & Tr	•	265	cuneata, Br	,,	120
Griffithii, Anders	. ,,	266 264	cuneata, Br	,,	118
Gutta, Wight		265	dasycarpa, Kurs	,,	120
heterandra, Wall			dasycarpa, Kurs	••• 11	110
	. 2 61,	262	densa, DO	11	109
Kydia, Roxb	. i.	262	densa, Wall	11	109
Kydiana, Laness	. 2 61,		Donia, Ham	,,	118
		265	dumetorum, Retz	,,	110 119
lateriflora, Bl	. i. . 263,		enneandra, Acom	,,	119
	. 202, . i.	264	fasciculata, Roxb	,,	109
loniceroides, Anders		203	1 1	*** 99	TOP
AOT'_AII'			•	U	

Gardenia	35-1 3	h	Garnotia	Vol.	Dago
A 12 1 TO 1	Vol. 1	ที่ก็ก	Fergussonii, Trim	• •	
florida, Linn		115	fuscata, Thw		244
fragrans, Koen	,,	11	Griffithii, Munro :.	"	243
glabra, Br	.,	No.	micrantha, Thw		244
	••• ,,	117			243
	,,	118	7 (71)		244
gummifera, Linn. f.	••• ,,	116	patula, Thw polygonoides, Duthie		243
ī 1 1 12	,,	115	polypogonoides, Munro		243
	,,	116	sandvicensis, Hillebr	• • • • • • • • • • • • • • • • • • • •	243
	,,	119	Schmidii, Ilk. f	•••	242
	,,	116			242
1. (' (1 ') () () () () ()	,,	110			241
	••• ,,	120		"	243
	,,	110	4 . 4 (70)		242
	 iii 109,		tectorum, Hk. f		242
		115	tenuiglumis, Stapf		242
, 'na		118	m1	"	241
, 10 1	,,	118		•	528
montana, Roxb nutans, Roxb	,,	110	Garuga, Roxb ? madagascariensis, DC	1.	528
1. 16 11 11 1	,,	116	pinnata, Roxb	"	528
obtusifolia, Rozb	,,	119	Gastonia Nalugu (lapsu, Gus-		020
oxycarpa, Br	••• ,,	109		i.	667
parviflora, Wall	,,	111	1 1 1	ii.	732
patula, Horsf	,,		palmata, Roxb Gastradiolus vide Garhadiolu		
P pomifera, Wall	,,	110		•	217
propinqua, Br	,,	110	Gastrochilus, Wall		218
pubescens, Roth	,,	120 114	affinis, Wall	37	218
pulcherrima, Kurz	,,		Jenkinsii, Wall		217
resinifera, Korth	,,	117	longiflora, Wall		217
resinifera, Roth	100	115	minor, King parvula, Wall		218
rigida, Wall	iii. 109,				217
sessiliflora, Wall		118	pulcherrima, Wall		218
speciosa, Hook	,,	117	rubrolutea, Baker		217
spinosa, Linn. f.	,,	110	speciosa, Kurz		218
stipularis, Rottl. & Wille	•	110	? tiliæfolia, Baker		218
suavis, Wall	••• ,,	116	tillandsioides, Baker		60
tentaculata, Hk	,,	119	Gastrochilus, D. Don		60
tetrandra, Bedd	••• ,,	107	calceolario, D. Don	• ' '	168
tetrasperma, Roxb	,,	109	Gastrocotyle, Bunge	ì٧.	168
tomentosa, Bl	,,	110	hispida, Bunge	-:	122
tubifera, Wall	,,	117	Gastrodia, Br		122
turgida, Roxb	,,	118	elata, Bl		123
uliginosa, Retz	;;	110	exilis, Hk. f	-	123
sp., Wall		109	P Hasseltii, Bl		123
GARDENIER Gardneria, Wall	iii. 19,		javanica, Enuc		122
Gardneria, Wall	i v.	93	orobanchoides, Benth		
angustifolia, Wall	,,	93	Gastrosulum præcos, Schultz		
nutans, Sirb. & Zucc.	• • "	93	Gaultheria, Linn		456
ovata, Wall	,,	93	discolor, Nutt		459 457
Wallichii, Wight	;;	98	fragrans, D. Don		
Garhadiolus angulosus, J.			fragrantissima, Wall		457 458
Hedypnois, J. & S	••• ,,	392	Griffithiana, Wight		
(lapsu Gastradiolus)		041	hirsuta, Gardner		458
Garnotia, Brongn	vii.		Hookeri, Clarke		458
angustata, Hack	,,	243	Leschenaultii, DC	-	457
arundinaces, Hk. f	,,	243	Nummularia, DC	• ••	457
ascendens, Munro	,,	243	nummularoides, D. Don		457 457
courtallensis, Thw	,,	244	ovalifolia, Wall	"	201

Gaultheria	Wal	Page	G:Intiana		V ol.∶	Da
	iii.	457	quatica, Linn.			110
pyrolæfolia, Hk. f		457	iquatica, Pall	•••	"	111
repens; Bl		457	argentea, Royle	iv.	112,	
trichophylla, Royle		457	aurea, Linn	•••	iv.	
sp., Griff iii. 457		. 461	azurea, Bunge	•••	"	109
Gaylussaccia incurvata, Griff				•••	"	113
	450,		barbata, Froel	•••	"	118
serrata, Lindl	•••	452	borealis, Bunge	•••	"	109
sp., Griff		450	brachypetala, Bunge	•••	"	118
Geanthus, Reinw	_:	233	oachemirica, Dene	•••	,,	115
Geissaspis, W. & A	• •	141	canaliculata, Royle	•••	"	119
cristata, W. & A		141	capitata, Ham		"	113
tenella, Benth		141	carinata, Griseb		"	113
Gela lanceolata, Lour	•	498	carinthiaca, Froel		"	120
Gelonium, Rowb		458	Centaurium, Linn		"	101
angustifolium, Muell	. ,,	459	cephalodes, Edgew		"	113
bifarium, Roxb	, ,,	459	Cherayta, Roxb		,,	124
bifarium, Wight		459	Chirata, Wall		,,	124
fasciculatum, Roxb		459	ciliata, Pall		"	118
glomerulatum, Hassk	,,,	460	contorta, Royle		,,	118
lanccolatum, Willd	,,,	459	coronata, Royle		"	114
multiflorum, A. Juss		459	crasea, Kurz		"	114
obtusum, Miq	, ,,	460	crinita, Froel	•••	,,	118
Gemella trifolia, Lour	i.	674	dahurica, Fisch		,,	117
Gendarussa bifaria, Wall	. i▼.	500	decemfids, Ham		,,	112
decussata, Nees	,,,	532	decumbens, Linn. f.	•••	. "	117
Neesiana, Wall		531	depressa, D. Don		٠,,	115
orivensis, Nees	11	529	detonsa, Fries	iv.	118,	734
quadrifaria, Nees		530	dichotoma, Pall	•••	iv.	109
Psumatrana, Miq		534	diffusa, Vahl	•••	,,	103
tranquebariensis, Nees	,,,	53 0	Elwesii, Clarke	•••	"	115
vasculosa, Nees	,,,	534	Falconeri, Clarke		"	108
ventricosa, Nees	, ,,	526	? floribunda, D. Don	•••	,,	124
virgata, Wall	,,,	525	glacialis, Thomas	•••	**	109
vulgaris, Nees	,,	532	heteroclita, Linn	•:•	,,	104
wynaadensis, Nees	,,,	533	holosteoides, Sch. & Kot	sch.	**	109
Genianthus, $Hk.f.$	įv.	15	Hugelii, Griseb	•••	**	114
orassifolius, Hk.f	,,	16	humilis, Steven	•••	"	111
laurifolius, Hk. f	***	16	infeliz, Clarke	•••	**	111
Maingayi, Hk.f	."	16	involucrata, Fries	•••	33 -	109
Geniosporum, Wall	iv.	f09	Jaeschkei, Kurz	•••	"	119
avillare, Benth	"	651	Karelini, Thoms	•••	",	110
elongatum, Benth	"	610	Koenigii, Gunn	•••	"	109
gracile, Benth	"	610	Kurroo, Royle	•••	"	117
parviflorum, Wall	"	611	laxicaulis, Zoll	•••	**	111
prostratum, Benth	••	610	Ledebourii, Robb. f.	•••	"	788
strobiliferum, Wall		610	Loderi, Hk. f	•••	"	118
Geniostoma acuminatum,	•••	00	lutea, Linn	•••	"	118
Wall	••	99 116	marginata, Clarke	•••	"	118
Genista versicolor, Wall			marginata, Griseb marginata, Wall	•••	**	118
Genistea	`•	109		•••	"	112
Gentiana, Linn		108 111	micans, Clarke minutissima, Boiss	•••	"	110
abscondita, Zenk		117	Moorcroftians, .Wall.	•••	"	108
adscendens, Pall		115		•••		119
amcena, Clarke		118	Moorcroftiana, Griseb.		79	109
Andersoni, Clarke		112	nubigena, Edgew	•••	77	116
aprica, Done	"	112	I manikana, mayaw	•••	"	110

BERAL INDEX.

Gentiana		ol.	age 14		A OI.	16
nudicaulis, Kurz	1	i▼. ˈ		dilatatum, Wall	₹i.	18
oligosperma, Gri seb. .	•••	,,	119	fucatum, Lindl	"	18
Olivieri, Griseb	••	"	317	javanicum, Lindl	"	
orbiculata, Heyne	•••	"	Til	laxiflorum, Griff	"	18
ornata, Wall	•••	"	116	pallidum, Wall	**	18
pedicellata, Wall		"	111	pallidum, Griff	"	18
- 1 1 D1-	• • •	"	109	purpureum, Br	"	16
-1 11 - 1 (111-		,,	116	rariflorum, Lindl	"	18
	· · ·	,,	110	recurvum,	**	187
		"	110	semicristatum, Lindl	"	18
77 A. 173		"	110	sp., Griff	"	18
	•••	"	109	Geophila, D. Don	iii.	
- 1 0 00	•••	"	111	diversifolia, DC	"	178
	•••	"	111	reniformis, D. Don	"	178
1 10 701	•••	"	111	Georchis biflora, Lindl	vi.	. 114
4.71 100 Dan	•••	"	109	cordata, Lindl	"	114
A1	•••	"	110	foliosa, Lindl	"	113
	•••		110	secundiflora, Griff., vide		
		"	734	Goodyera	"	113
	•••	"	120	vittata, Lindl	"	114
	•••	"	112	GERANIACEÆ	ï.	426
	•••	"	734	GERANIEE	i.	426
	•••	"	114	Geranium, Linn	i.	428
	•••	"	iii	**************************************		429
		"	120	AP . TET AL A	"	431
Stelleriana, Cham. & Sch		"	115		17	481
	•••	"		4	17	481
	•••	"	109 118	Darkhausianum Darah	"	430
	••	"		1 1 1 D. 1.	"	433
	•••	"	109	ahaanaa Damla	"	488
	•••	"	109	choorense, Royle	13	429
	•••	"	109	collinum, Bieb Donianum, Hk. f. & T	17	481
	•••	"	788	Donianum, rik. i. & T	"	430
	•••	"	109	Donianum, Wall	"	430
	•••	"	116	eriostemon, D. Don	"	
umbellata, Bieb	•••	"	109	grandiflorum, Edgew	**	430
	•••	"	116	Grevilleanum, Wall	"	430
verticillaris, Retz	•••	"	101	heterotrichon, Sm	"	488
verticillata, Linn	•••	**	101	himalayense, Klotz	"	429
volubilis, D. Don	•••	"	108	lævigatum, Royle	17	433
seylanica, Griseb	•••	. 22	111	? Lamberti, Sweet	"	430
sp., Clarke iv. 110, 11	L4, :	115,	116	? Lawianum, Grah	"	427
sp., Gmel iv. 11	•••	iv.	117	Lindleyanum, Royle	"	438
sp., Griff iv. 11	L 1, 1	L18,	122	luoidum, Linn	"	438
sp., Hk. f. & T 1V. 10	ע, ש	ιτυ,	TTT,	molle, Linn	"	482
112, 114, 115, 1	17,	118,	, 127	multifidum, D. Don	"	430
GENTIANACEA	•••	i٧.	98	nepalense, Sw	,,	480
Gentianella barbata, G. Do	n.	i₹.	118	ocellatum, Camb	11	488
		"	118	pallidum, Royle		431
Geocallis fasciculata, Hora	n.	νï.	241	P palustre, Linn	,,	430
		vi.	16	patens, Royle	"	481
	•••	1)	18	pedunculatum, Royle	•	488
	•••		17	polyanthes, Edgew. & Hk.	f	431
111 777 11		99	17	potentilloides, Klotz		482
candidum, Wall	•••	"	18	prateuse, Linn	"	429
candidum, Lindl	•••	"	17	manillana Tima	"	482
	•••	"	17		**	481
	•••	"	18	mandamen Manadas	**	429
dilatatum, Lindl	•••	"	10	rectum, Trautv	77	-20

Geranium Vol. Pag		Vol.	Page
refractum, Edgew & Hk. f. i. 429	3 Gfibertia Nalugu, DC	i.	667
Robertianum, Linn ,, 432		ii.	732
rotundifolium, Linn ,, 43:	Caualloa, Korth	٧.	228
sibirioum, Linn ,, 43:	andamanica, Kurz	**	228
Tuberaria, Camb ,, 43		"	228
Wallichianum, Sw ,, 430) spathulifolia, Oliv	11	228
Gerardia dephinifolia, Linn. iv. 30		٧.	550
Heyneana, Benth ,, 30		,,	550
parviflora, Wall ,, 304		"	551
scabra, Wall ,, 30		"	551
0l'- D11 900		₹.	485
-d'-d Dd 200	- 22.	"	485
GERARDIE iv. 248, 297			486
a) . 7	"	436
1		"	485
T D		"	486
lanuminana Dandh " 900		"	486
		"	485
macrophylla, Benth ,, 391		"	485
nivea, Benth , 390		??	664
nivea, Clarke ,, 390		11.	
ovalifolia, DC ,, 390		"	664
piloselloides, Cass ,, 389	1	"	664
Germainia, Bal. & Poitr. vii. 163, 421		"	664
capitata, Bal. & Poitr , 163		▼.	8 95
khasiana, Hack ,, 163		"	395
lanipes, $Hk. f.$, 168		_▼.	158
Germania Forskohlii, Poir iv. 626		","	158
nudiflora, Poir ,, 626		ii.	462
rotundifolia, Poir ,, 624		iii.	505
Gerontogea bistora, Cham. &	maritima, Linn	,,	505
8ch iii. 64	Glechoma erecta, Roxb	iv.	661
Gesneraceæ iv. 336	hindostana, Roth	"	661
Gethyllis fusiformis, Ham vi. 279	indica, Spreng	"	661
Getonia floribunda, Roxb ii. 449		ii.	261
nitida, Roth ,, 450	Gleniea (Glenniea), Hk. f.	i.	682
nutans, Roxb , 449		685,	690
Geum, Linn ii. 342		ii.	662
adnatum, Wall ,, 343		,,	662
-1-4 107-11 " 949		"	662
Da., I., W. 11 949	· ·	"	662
		"	661
Geunsia, $Blume$ iv. 566		"	662
e D1 E00			661
		γi.	201
alka ailiatu Vana 401			202
	17	" 、	203
		"	205
auriculata, Kurz ,, 896		"	206
heterostachya, Munro , 400		"	204
Kurzii, Gamble ,, 399		"	206
latispiculata, Gamble , 400	halbitana Dank	"	
ligulata, Gamble ,, 400		"	206
macrostachya, Kurz , 399	n n 1	"	206
maxima, Kurz ,, 398	Careyana, Roxb	"	203
nigro-ciliata, Kurz " 401	cernus, Baker	"	205
Scortechinii, Gamble , 398		"	201
verticillata, Munro ,, 398	elongata, King	"	203
Wravi, Gamble 399	erecta, Red	"	254

Globba	Wal	n.K.	Glochidion	,	r _{ol}	Page
espansa, Wall vi	Vol. . 20∔,	2015	desmogyne, Hk. f		₹.	310
		200	distichum, Hance			317
		20	diversifolium, Bedd.	••••		321
17 DL	••	205	111-41- 777-74		"	321
***		204	fagifolium, Miq	•••	"	312
7 A D1		205	frondosum, Baill	•••	"	292
		206	Gamblei, Hk. f	•••	"	310
marantina, Linn marantina, Wall	• • • • • • • • • • • • • • • • • • • •	206	Gardneri, Thw.	•••	"	325
117.		206	glaucifolium, Muell.		"	321
		202	glaucogynum, Bedd.		"	325
multiflora, Wall	•	205	goniocarpum, Hk. f.	•••	• • •	309
		256	Helferi, Hk. f		"	311
ophioglossa, Wight		202	Heyneanum, Wight		"	323
orizensis, Roxb	•••	201	hirsutum, Muell		"	311
orizensis, Wali. vi. 201			Hobenackeri, Bedd.		"	314
pallidiflora, Baker		204	insulare, Hk. f		"	310
		203	Johnstonei, Hk. f		"	314
J_ I_ D1		205	Jussieuianum, Thw.		"	320
		202	khasioum, Hk. f		"	324
- 1 1 D-1		206	lævigatum, Hk. f			319
purpurea, Andr		200	lanceolarium, Dalz.		"	308
racemosa, Sm		201	leiostylum, Kurz		"	324
radicalis, Roxb		200	leptogynum, Bedd		"	325
saltatoria, Rosc		200	littorale, Bl		"	308
Schomburgkii, Hk. f		206	macrostigma, Hk. f.		"	313
sessiliflora, Sims		203	malabaricum, Bedd.		"	319
spathulata, Roxb	-	201	microbotrys, Ilk. f.		"	319
stenothyrsa, Baker		204	mishmiense, Hk. f	•••	"	327
strobilifera, Zoll. & Moritz	. ,,	206	montanum, Thw		"	325
subscaposa, Coll. & Hemsi		204	Moonii, Thw		"	325
substrigosa, King		202	multiloculare, Muell.		"	307
subulata, Roxb		200	nanogynum, Hk. f		"	318
uliginosa, Miquel	•	203	neilgherrense, Wight	•••	"	316
velutina, Wall		202	nemorale, Thw		"	324
versicolor, Sm		205	nitidum, Dalz. & Gibs.		"	311
Wallichii, Baker	•••	202	nubigenum, Hk . f		,,	315
Glochidion, Forst		305	oblatum, Hk. f		"	312
souminatum, Muell		323	cbliquum, Done		"	311
andamanicum, Kurz		322	obscurum, Bl		"	317
arboreum, Wight		316	perakense, Hk . f		"	317
assamicum, Hk . f		319	Perrottetianum, Bedd.		"	316
bancanum, Miq		311	pycnocarpum, Bedd.		"	315
brachylobum, Muell		313	Ralphii, Hk . f		"	314
brunneum, Hk . f		312	rigidum, Muell		"	320
calocarpum, Kurz	. ,,	30 9	Roxburghianum, Muell.		,,	317
canaranum, Miq	. ,,	311	sclerophyllum, Hk. f.		"	313
canarum, Bedd	. ,,	311	sericeum, Hk. f		"	32 6
Candolleanum, Hk. f		816	sphærogynum, Kurz		"	317
coccineum, Muell	. ,,	3 08	subscandens, Kurz		,,	312
coriaceum. Thw	. ,,	32 1	superbum, Baill	•••	,,	323
coriaceum, Thw v	. 313	, 316	symplocoides, Bedd.		"	325
coronatum. Hk. f	. v .	326	Thomsoni, Hk. f		"	318
Curtisii, Hk. f	. ,,	327	Thwaitesii, Muell	•••	"	320
Daltoni, Kurs		320	tomentosum, Dalz	•••	,,	809
dasyphyllum, Miq	. ,,	323	velutinum, Wight		,17	322
dasystylum, Kurs		327	villicaule, Hk. f		,,	326
desmocarpum, Hk. f		318	Wallichianum, Muell.		,,	315

6	_1 .		
Glochidion Vol. Pa		Vol.	
		ii.	222
	1 3 7 13 7 19	,,	221
Glochisandra acuminata,	00 7 1 1 7 50	,,	182
. 9		,,	184
		,,	226
Gloriosa, Linn vi. 35		,,	221
		,,	182
	filiformis, Wall	,,	192
	1 'a 11 'a .	,,	63
Glossanthus grandiflorus,		··· " •	185
		,",	191
,,		i. 181,	
	Opp '7 7 1 7 1 7 1	ii.	183
a) 11 a		,,	184
		,,,	68
		,,	192
, · · · · · · · · · · · · · · · · ·		,,	224
dicesses,		,,	184
, , , , , , , , , , , , , , , , , , , ,		,,	153
		,,	221
		,,	192
tenera, D. Don ,, 43	32 pallens, Grah	,,	184
thalictrifolia, Wall ,, 45	32 parviftora, Lam	,,	184
Glossogyne iii. 31	10 parviflora, Wall	,,	184
pinnatifida, DC ,, 31	10 pentaphylla, Dalz	,,	184
Glossonema, Dene iv.	16 pondicheriensis, Spreng		220
varians, Benth ,,	16 rhombifolia, Willd	,,	223
Glossospermum? cordatum,	rufescens, Willd	,,	2 20
Wall i. 37	74 senegalensis, DC	,,	184
	00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	,,	184
	71	,,	222
Glossostelma, Wight iv.	4PF4P-74 - 3\$7-11	. ,,	182
	Or A. Cast	,,	184
		,,	192
Glossostylis arvensis, Benth iv. 29	07 tana 4 am Wille	,,	192
Glossula Tentacula, Lindl vi. 16	20 A D-1-	,,	210
	Ol make Clark	,,	181
	00	,,	154
, , , , , , , , , , , , , , , , , , ,	00	,,	184
	00 01 01	i.	499
Annua comica Dolli	00		500
	ac i no	,,	500
minute. Dakk 91	10 121	,,	500
named and T. & C. Dennel 91	10 11 1 A	••	501
Orinah " 3/	477 1 1 1 117 6 4		500
Wales Wales 24			501
24 . 777 7 77	477		500
d	1 11 7 11	•••	500
d. 't D. Abla	40) '4' 1 YAZ 8 A		500
June Chang	10	,,	499
turburba Tana	10 1 1 1 7 11	,,	501
, , , , , , , , , , , , , , , , , , , ,	no for 11 m'	"	500
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,,	501
,, _		,,	
Annual Clarks 2		??	500
someone, even in it in m	Glycycarpus racemosus, Dal		40
707113 3		i.	612
aurea, Willd ,, 22	$21 \mid \mathbf{grandiflorum}, \mathbf{\textit{Bedd}}.$,,	613

_			ſ			
Glyptopetalum	•	Vol.	Pag 31	Gnaphalium	V ol. 1	Page
sclerocarpum, Kurz	•••	i.	3Í	nilaicum, Raddi	iii.	289
seylanioum, Thw	•••		612	Notonianum, Wall	,"	284
Gmelina, Linn,		iv.	581	nubigenum, Wall	٠,,	280
arborea, Linn		,,	581	orixense, Roxb	,,	288
asiatica, Linn		.,	582	pallidum, Ham	.,	288
asiatica, Wall		,,	582	perfoliatum, Wall	,,	281
coromandeliana, Burm.	•••	,,	582	prostratum, Roxb	"	289
Finlaysoniana, Wall.		"	582	pulchellum, Wall	,,	279
Hystrix, Kurz	•••	"	582	pulvinatum, Del	,,	289
inermis, Blanco	•••	"	582	purpureum, Linn	"	289
lobata, Gaertn		•••	582	ramigerum, DC	"	288
oblongifolia, Roxb	•••	"	582	semidecurrens, Wall	,,	283
parvifora, Rozb			582	simplicicaule, Wall	"	285
parvifolia, Roxb		"	582	spathulatum, Del	"	289
Dr. Jan tr. de		"	581	spicatum, Vahl		278
speciosissima, D. Don	···	257	583	6	**	289
		iv.	582		17	289
	•••		582		,,	283
sp., Griff	•••	:::	288	subdecurrens, DC tenellum, Wall	,,	285
Gnaphalium, Linn	•••	111.	282	700	"	290
adnatum, Wall	•••	. "	288		"	290
affine, D. Don	•••	"	288	uliginosum, Clarke	"	230
albo-luteum, Roxb		"	200	? villosissima, vide Anten-		283
ammophilum (anemop			278	naria	"	286
lum), Wall	•••	"		Wightianum, DC	97	
brevifolium, Thw	•••	"	287	Wightianum, Thw. iii. 281,		
Busua, Ham :	•••	**	283	Wightii, Thw		284
canum, Wall	•••	,•	280	l ~ - '	284,	
chrysanthum, Sch	•••	"	290	GNETACEÆ	▼.	
cinnamomeum, Sch	•••	"	286	Gnetum, Linn	₹.	641
cinnamomeum, Wall.	•••	"	281	apiculatum, Griff	,,	642
confusum, DC	•••	"	283	Brunonianum, Griff	"	642
contortum, Ham	•••	"	285	edule, Bl	"	643
crispatulum, Clarke	•••	73	289	funiculare, Bl	11	643
crispatulum, Del	•••	"	290	funiculare, Wight	19	643
cuneifolium, Wall	• • •	',,	280	Gnemon, Linn	"	641
cylindrostachyum, Wall	• • • • •	"	275	gnemonoides, Brongn	"	643
cynoglossoides, Sch	•••	"	291	Griffithii, Parlat	17	642
cynoglossoides, Trev.	•••	"	281	latifolium, Parlat	17	643
? decurrens, Ham	•••	"	283	macropodum, Kurz	"	643
depressum, Roxb	•••	"	289	macrostachyum, Hk. f	,,	642
flacoidum, Kurz	•••	,,	290	microcarpum, Bl	,,	642
Hamiltoni, Wall	•••	,,	264	? neglectum, Bl	11	642
Hookerianum, Thw	•••	,,	291	pyrifolium, Miq	"	643
hurdwaricum, Wall.	•••	,,	277	scandens, Roxb	19	642
hypoleucum, DC		"	288	Ula, Brongn	,,	643
indicum, Linn		"	289	sp., Wall	` ,,	648
indicum, Thw	•••	"	283	Gnidia eriocephala, Meissn.	٧.	197
intermedium, Wall		"	280	insularis, Gardn	,,	197
luteo-album, Linn		,,	288	monticola, Miq	,,	197
macranthum, Sch. Bip.	•••	,,	290	sisparensis, Gardn	••	197
marcescens, Wight	•••	"	286	Gochnatia spectabilis, Less.	iii.	387
martabanicum, Wall.	•••	"	288	Goebelia alopecuroides, Bunge		250
multicaule. Boxb	•••	,,	289	Goldbachia, DC	i.	166
multiceps, Wall	•••	"	288	lævigata, DC	"	166
muscoides, Dosf		,,	287	torulosa, DC	"	166
neelgerrianum, DC		"	287	Goldbachia, Trin		
nilagiricum, Soh		"	287	Mikani, Trin	"	73
		**	•	,,	"	

GENERAL INI,EX.

Vol. Page (Gor, iphostemma	Vol. P	
Goldfussia anisophylla, Nees iv. 462	chinitum, Wall		698
biceps, Nees ,, 459	e hocarpum, Benth	- ,, (6 98
biceps, Wall ,, 429	Heyneanum, Wall		696
bracteata, Nees iv. 443, 460	acidum, Wall		697
capitata, Nees iv. 459	Mastersii, Benth		699
	melissæfolium, Wall	",	698
	127 A 27 TRY 11	·"	699
Cusia. Nees ,, 475	1 10 11 301	"	694
	2.14	"	697
		• • •	697
decurrens, Wight ,, 440	niveum, Hk. f		
discolor, Nees ,, 462	nutans, Hk. f		697
divaricata, Nees ,, 469	oblongum, Wall		697
Edgeworthiana, Nees ,, 466	oblongum, Wight		698
extensa, Nees ,, 463	ovatum, Wall	"	699
flexuosa, Nees ,, 460	parviflorum, Wall	,,	697
glomerata, Nees ,, 448	pedunculatum, Benth	,,	696
isophylla, Nees ,, 462	strobilinum, Wall	,, (896
lamiifolia, Nees ,, 463	Thomsonii, Benth		698
Leschenaultiana, Nees iv. 433, 439	velutinum, Benth		699
Myrtinia, Nees iv. 437	viride, Wall	" '	696
	Gomphostylis candida, Wall.	"	141
			732
111 37			732
, and an in the same and a same a	angustifolia, Vahl		
Thomsoni, Hook ,, 471	globosa, Linn		732
tristis, Wight ,, 441	hispida, Linn		732
Zenkeriana, Nees ,, 439	sessilis, Linn	,,,	731
Zenkeriana, Wight ,, 440	GOMPHRENEE	_	714
sρ., Griff ,, 469	Gomutus obtusifolia, Bl	vi.	421
sp., Hk. f. & T. iv. 461, 462, 463,	saccharifer, Spreng		421
469, 471, 472	Gonatanthus, Klotz	vi.	522
Golowninia japonica, Maxim. iv. 107	Griffithii, Schott	**	520
Gomphandra, Wall i. 585	? ornstus, Schott		522
m : 25 4	sarmentosus, Klotz		522
****	Gonatostemon Boucheanum.		
	,	•	358
0 16 16		•	38
	Gongronema, Done		83
penangiana, Wall , 587	columnare, Done	**	
polymorpha, Wight , 586	? Finlaysonii, Done	"	34
polymorpha, Wight ,, 580	nepalense, Dcne	,,	33
tomentella, Mast ,, 587	sagittatum, Done	**	33
Gomphia, Schreb i. 525	ventricosum, Hk. f	"	34
angustifolia, Vahl ,, 525	Wallichii, Dene	"	33
Hookeri, Planch ,, 525	Goniocarpus micranthus,		
malabarica, DC ,. 525	Kæn. & Sims	ii.	430
sumatrana, Jack i. 525, 527	scaber, Koen. & Sims	,,	431
sumatrana (sumatrensis),	tetragynus, Labill	••	431
Planch i. 525	Goniocaulon, Cass	•	377
	glabrum, Cass		377
	7 22 (111	••	377
20 June 10 10 10 10 10 10 10 10 10 10 10 10 10	Goniogyna hebecarpa, DC		65
Gomphocarpus lævigatus,			
Ham iv. 65	latebrosa, DC		65
volubilis, Ham " 21	leiocarpa, DC	• • •	65
Gomphogyne, Griff ii. 632	Gonioscypha, Baker		
cissiformis, Griff ,, 632	eucomoides, Baker	**	32 6
heterosperms, Kurz , 632	Goniostemma acuminatum,		•
Gomphostemms, Wall iv. 696	Wight		15
acaule, Kurs ,, 696	Goniothalamus, Bl	i.	72

Goniothalamus	Vol.	Pige 75 75	Goodyera	Vol.	
cardiopetalus, Hk. f. & T.	i.	75	vittata, Benth	vi.	113
fulvus, Hk. f. S T	"	75	sp., Griff vi. 105, 113		
Gardneri, $Hk. f. \ Y T. \dots$	"	73		i.	290
giganteus, $Hk. f. \mathcal{Y} T. \dots$	"			282,	
Griffithii, Hk. f. & T	"	73	anomala, Spreng	i.	292
Hookeri, Thw	"	73	Chilaunia, Ham	"	289
macrophyllus, Hk. f. & T.	"	74	decandra, Roxb	• ••	417
malayanus, Hk. f. & T	"	75	elliptica, $Gardn$	* **	291
reticulatus, Thw	"	75	excelsa, Bl	* **	291
salicinus, Hk. f. & T	,,	76	floribunda, Wall	• ••	289
sesquipedalis, Hk. f. Y T.	"	73	integrifolia, Roxb	• • • • • • • • • • • • • • • • • • • •	289
Simonsii, Hk. f. Y T	"	74	Maingayi, Dyer	"	291
Stingelandtii, Scheff	"	75	mollis, Wall	• ••	288
Thomsoni, Thw	"	74	oblata, Roxb	"	289
Thwaitesii, Hk. f. S. T	"	72	obtusa, Wall	* **	291
Walkerii, Hk. f. J. T	"	74	oblusifolia, Wight	* **	291
Wightii, Hk . f . T	"	76	parvifolia, Wight	* >>	291
wynnadensis, Bedd	1,	74	? peduncularis, Wall	"	416
Gonocarpus micronthus,			reticulata, Wall	,,	282
Thunb	ii.	430	singaporiana, Wall	"	291
Gonocaryum ? gracile, Miq	i.	590	speciosa, Thw	"	292
Gonostegia oppositifolia,			superba, Hk. f. & T	"	289
Turcz	٧.	583	Wallichii, DC	"	289
Gonotheca Blumei, DC	iii.	70	zeylanica, $Wight$	• ••	291
Gonyanthes? candida, Bl	₹.	665	sp., Griff	,,	289
nepalensis, Miors	"	666	GORDONIEÆ		279
pusilla, Miers	,,	665	Gossampinus rubra, Ham		349
Wallichii, Miers	"	666	Gossypium, Linn	. i.	346
Gonystylus, Teijsm. & Binn.	٧.	200	acuminatum, Roxb	"	347
bancanus, Baill	"	201	album, W. & A	"	346
Maingayi, $Hk. f.$,,	200	arboreum, Linn	,,	347
Miquelianus, Teijsm. & Binz	ı. ,,	201	barbadense, Linn	,,,	347
Goodenovieæ		420	herbaceum, Linn	,,	346
Goodyera, Br vi.	110,		hirsutum, Linn	,,	347
biflora, Hk . f	٧i.	114	indicum, Lamk	• ••	346
carnea, A. Rich	"	111	micranthum, DC	• ••	346
cordata, Benth	11	114	nigrum, Ham	,,	347
discolor, Ker	"	101	nigrum, W. & A	• • • • • • • • • • • • • • • • • • • •	347
elongata, Lindl	"	116	obtusifolium, Roxb	"	347
flabellata, A. Rich	,,	106	peruvianum, Cav	,,	347
foliosa, Benth	"	113	religiosum, Parl	,,,	347
fumata, Thw	"	111	religiosum, Roxb	• ••	347
fusca, Hk. f	"	112	rubicundum, Roxb	• ••	347
gracilis, $Hk f. \dots \dots \dots$	"	112	Stocksii, Mast	22	346
hirsuta, Griff	"	94	vitifolium, Lamk	,,,	347
hispida, Lindl	"	114	vitifolium, Roxb		347
marginata, Lindl	"	112	Gouania, Linn	. i.	643
ovalifolia, Wight	,,	115	integrifolia, Kurz	,,,	643
Prainii, Hk. f	,,	112	lanceolata, Wall	,,,	644
procera, Hook	,,	111	leptostachya, DC	,,,	643
recurva, Lindl	,,	112	microcarpa, DC	,,,	643
repens, Br	"	111	napalensis, Wall	, ,,	644
robusta, Hk. f	"	113	tiliæfolia, Heyne	, ,,	648
rubens, Bl		111	GOUANIEÆ		630
secundiflors, Lindl		113	Gouffeia crassiuscula, Camb	. i.	241
secundiflora, Griff. (lapsu			Goughia Griffithiana, Wigh	t v.	35 3
Georchis)		113	himalensis, Benth		354

Goughia Vol. Page	I Chatisia	37.4 50
	Gratiola Monniera, Linn	Vol. Page iv. 272
		074
	nudicaulis, Willd	" 000
Govania nivea, Wall v. 395	oppositifolia, Roxb	. , ,
Govindovia nervosa, Wight vi. 92	parviflora, Roxb	. "
Graciles, Kæn vii. 283	pulegiifolia, Vahl	
nutans, Kan , 283	pusilla, Willd	
Royleana, Hk. f , 284	racemosa, Roth	
GRAMINEÆ vii. 1	racemosa, Roxb	
Gramin. Griff vii. 307	reptans, Roxb	
Gramin. Wall vii. 242, 243, 271,	rotundifolia, Linn	
273, 312	Roxburghiana, R. & S	
Grammatophyllum, Bl vi. 18	ruelloides, Kon	
affine, Griff ,, 19	serrata, Roxb	
fastuosum, Lindl ,, 18	strigosa, Roth	
? Finlaysonianum, Lindl. ,, 20	tenuifolia, Vahl	
macranthum, Robb. f ,, 18	trifida, Willd	. " 271
paludosum, Griff ,, 19	verbenæfolia, Colsm	
scandens, Griff ,, 19	veronicæfolia, Retz	. "285
speciosum, Bl ,, 18	virginiana, Linn	071
Grammica aphylla, Lour iv. 227	GRATIOLEÆ iv	. 247, 258
Granatum littoreum, Rumph i. 567	Grayia elegans, Nees	
Grangea, Forsk iii. 246	zeulanica. Arn.	, , 216
latifolia, Lamk ,, 245	Greenea, W. & A	
maderaspatana, Poir ,, 247	Jackii, W. & A	. " 41
sphæranthus, Koch ,, 247	Wightiana, W. S. A	41
Grantia Aucheri, Boiss iii. 296	Grewia, Linn	
globosa, Griff vi. 558	abutilifolia, Juss	
microscopica, Griff " 558	acuminata, Juss	″ 400
Graphaphorum nutans,	affinis, Hask	900
Muuro vii. 312, 422	affinis, Lindl	″ 909
Graptophyllum, Nees iv. 545	angustifolia, Wall	901
hortense, Nees ,, 545	araria, Wall	" 000
pictum, Griff " 545	arborea, Roth	
Gratiola, Linn iv. 273	asiatica, Linn	" 000
amara, Roxb ,, 275		. 387, 390
aphylla, Roth ,, 274	aspera, Roxb	
960	beyonifolia, Wall	000
aspera, Roth ,, 200	betulæfolia, Juss	″ 00=
ahamadnifalia Lauk 979	bicolor, Juss	" 000
OL	bicolor, Roth	" 905
ailiata Colom 985	biloba, Wall	" 901
ailinta IZma	bipartita, Wall	" 999
saudifalia Wahl 989	Blumei, Hassk	,, 000
16 11 TO 1	bracteata, Roth	" ·200
goodenimielia Hornom 950	bracteata, Mig	900
anandiffora Boxb 295	1 1 1 - 1 - 1 - 1 - 1	" 200
Chicarlii Ul. f 973	1 7 74 10 7	
husesminides Linn 289	Annual Calling Double	" "
hussaminidas Donb 974		" 900
intermifolia Rosh 991		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	Α	″ 005
	1 6	970
7	1	່ ນມອ
		900
	1 . ~ .	900
	corracea, Garcke corylefolia, Guill. & Perr	900
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1 11 11 11	900
minima, Roth ,, 286	didyma, Koxb	. ,, აგყ

Grewia		¥ol.	Page	Grewia		Vol.	Page
diplocarpa, Thw		i.	Page 390	rhamnifolia, Roth		i.	384
disperma, Rottl		12	389	rigida, Ham		,,	385
elastica, Royle	•••	"	387	Ritchiei, Mast		٠,,	389
emarginats, W. S. A.	•••	"	384	Rothii, DC		,,	385
excelsa, Vahl		27	385	rotundifolia, Juss		"	386
ferruginea, Hochst	•••		389	Roxburghii, G. Don	•••	,,	391
fibrocarpa, Mast	•••	"	391	rugosa, Wall	•••	,,	393
flavescens, Juss	•••	"	388	salvifolia, Heyne		"	386
		"	393	salvifolia, Roxb		"	385
1 1 100 TA .	•••	"	391	salvifolia, Wall			391
helicterifolia, Wall	•••	"	391	l - '' - '' - '	•••	"	387
	•••	"	379			"	391
heteroclita, Roxb	•••	"	385		•••	"	389
heterotricha, Mast	•••	"	391	scabrida, Wall scabrida, Wall	•••	"	388
hirsuta, Vahl hirsuta, Wall	•••	"			•••	"	387
nirsuta, wall	•••	"	391	scabrophylla, Roxb	•••	"	387
humilis, Wall	•••	"	390	sclerophylla, Wall	•••	"	
involucrata, Wall	•••	"	384	sepiaria, Roxb	•••	"	388
involucrata, Wight	•••	"	388	serrulata, DC	•••	"	388
lævigata, Vahl	•••	"	389	sinuata, Wall	•••	W,	392
Lalpeta, Ham	•••	"	389	subinæqualis, DC	•••	"	386
lanceæfolia, Grah	•••	"	891	subinæqualis, Wall	•••	,,	386
Planceæfolia, Roxb	•••	,,	391	suffruticosa, Ham	•••	,,	387
lanceolata, Hb. Heyne		"	391	sulcata, Wall	• • •	"	387
latifolia, Mast	• • • •	,,	392	Sulcoria, Ham	• • •	"	391
laurifolia, Hook	•••	,,	392	tiliæfolia, Vahl	•••	"	386
laurifolia, Hook		٧.	136	ulmifolia, Roxb	•••	,,	392
longifolia, Ham		i.	391	umbellata, Roxb		,,	385
macrophylla, G. Don		,,	390	umbellifera, Bedd		,,	393
Microcos, Linn		"	392	variabilis, Wall	•••	,,	386
microstemma, Wall.	•••	"	390	vestita, Wall		,,	387
mollococca, Ham	•••	"	389	villosa, Willd		,,	388
multiflora, Juss		"	388	viminea, Wall	•••	"	391
nana, Wall	•••	. "	387	GREWIEÆ	•••	í.	380
obliqua, Roxb	•••	"	387	Griffitnia curvata, Karz	•••	iii.	111
ohtecta, Wall		"	387	777 8. A	•••	"	111
obtusa, Wall i.	383,			Gardneri, Thw	•••	"	112
odorata, Bl	_		389	rugulosa, Thw	•••	"	113
oppositifolia, Rosb	•••	"	384	siamensis, Miq	•••		111
orbicularis, G. Don	•••	"	386	n. 23	•••	"	113
	•••	"	386	sp., Hk. f. & T		1"2,	
orbiculata, Rottl orbiculata, G. Don	•••	,,	388	Grislea micropetala, Hoch		ii.	572
	•••	"	386				572
orbiculata, Wall	•••	"	384	punctata, Ham tomentosa, Roxb	•••	"	572
orientalia, Linn	•••	11	388	*# 112 - L	•••	**	572
orientalis, Gertn	•••	"	383		•••	ii.	191
orientalis, Vahl	•••	"		Grons, Lour	•••		191
orientalis, Wall	•••	9?	384	Dalzellii, Baker		"	191
ovalifolia, Juss	•••	"	389		•••	"	
ovalifolia, Wight	•••	"	384		• • •	"	191
paniculata, Roxb	•••	,,	393	Grosourdya Hystrix, Robb.		Vi.	39
pedicellata, Roxb	•••	"	385		•••	iii.	167
pilosa, Lamk	•••	"	388	aurantiaca, Miq	•••	"	165
pilosa, Roxb	-::-	.".	391		•••	"	163
pilosa, Wall. i. 383, 384,	387,				•••	"	161
polygama, Rozb.	•••	i.	391	Junghuhniana, Miq	•••	ii.	166
populifolia, Vahl	•••	"	385		•••	"	171
pumila, Ham	•••	,,	387		•••	**	170
retusifolia Knrz			890	Pniora Geertn			162

Grumilea .			V ol.	Page	Guazuma	Vol.	Page
nudiflora, Thw.			ii.	162	tomentosa, Kunth		375
putens, Schlecht.	***	•••	,,,	162	ulmifolia, Wall		375
polycarpa, Miq.	•••	•••	"	165	Guettarda, Linn	, , .	126
stenophylla, Thw.	•••	•••		161	D		127
subintegra, W. & A			"	162	Walasaniana Wall		127
vaginans, Dalz		•••	"	176			127
Wightiana, Thw.	•••	•••	17	167	9 martin milania Wall		
	•••	•••	"		P peduncularis, Wall		127
Grymania, Presl	r- 11	•••	ij.	309	peduncularis, Wall	• ,,	127
Guarea acuminata, V		•••	i.	547	speciosa, Linn	. ,,	126
Alliaria, Ham	•••	•••	"	548	sp., Wall		41
P Amaris, Ham			"	546	GUETTARDEÆ i	ii. 20	, 126
binectarifera, Rozb		•••	,,	546	Guilandina axillaris, Lamk	. ii.	258
disyphonia, Griff.	•••		11	547	Bonduc, Linn		255
Gobara, Ham			"	547	Bonduc, W. & A	•••	254
Gotadhora, Ham			"	546	Bonducella, Linn		254
grandis, Wall	•••		• • •	547	l alakaa Mili		255
mollis, Wall			"	548			258
oblonga, Wall		•••	"	547		••	
	•••	•••	77		Moringa, Linn	•••	45
oblongifolia, Griff.	•••	•••	"	567	Nuga, Linn	• ,,	255
paniculata, Roxb.	•••	•••	"	552	Wallichiana, Grah	.".	268
paniculata, Wall.	•••	•••	"	548	Guizotia, Cass	iti.	307
procera, Wall		•••	27	547	abyssynica, Cass	• ••	308
Guatteria acutiflora, V	Vall.	•••	i.	64	oleifera, DC	19	308
acutifolia, Wall.			"	89	Guldenstaedtia, Fisch		117
bifaria, A. DC			,,	62	cuneata, Benth	. ,,	117
biglandulosa, Bl.			"	63	himalaica, Bak. r		117
brevipetala, Miq.				66	mirpourensis, Benth	•••	118
? caudata, Wall.	•••		**	85		••	118
cerasoides, Dun.		•••	**	61	Gumira integrifolia, Hassk		
	•••	•••	"	65	litterary Dramah	17.	574
cinnamomea, Wall.		•••	"	62	litturea, Rumph	,"	574
coffenides, Thw	•••	•••	"		Gumsia chlorosylon, Ham	i.	371
cordata, Dun	•••	•••	"	49	hirta, Ham	"	37 0
costata, Hk. f. & T.	•••	•••	"	67	tiliacea, Wall	, ,,	871
fasciculata, Wall.	•••	•••	,,,	63	Gunisanthus, A. DC	iii.	553
? flavicans, Wall.	•••	•••	iii.	562	mollis, Kurs	"	554
fragrans, Dalz		•••	i.	F3	pilosulus, A. DC	"	554
globosa, A. DC	•••	•••	"	87	Gurua obovata, Ham	iv.	7
Jenkinsii, Hk. f. &	T.	•••	"	64	Gussonea cyperoides, Presl	vi.	650
Korinti, Dun.		•••	"	64	rauciflora, Brong		649
laurifolia, Grah.				98	O	ű.	511
longifolia, Wall.	•••	•••	"	62	Charles - Like Charles !	i.	667
macrophylla, Bl.		•••	"	66	A	266,	
malabarica, Dun.	•••	•••	"	51	0		
	٠	•••	"	68	Gumnadania Chasas Ti-di	i.	258
membranacea, A. DC		•••	"		Gymnadenia Chusua, Lindl.	٧i	127
micrantha, A. DC.	•••	•••	"	51	cylindrostachya, Lindl	***	142
montana, DC	•••	•••	"	51	galeandra, Rohb. f	"	164
multinervis, Wall.		•••	"	65	Helferi, Robb. f	"	164
nitida, A. DC		•••	"	64	longifolia, Lindl	"	141
pallida, Hk. f. & T.	•••	•••	"	67	obcordata, Rohb. f	"	164
persicasfolia, Hk. f.			"	66	Orchidis, Lindl	"	142
ramosissima, Wall.			"	68	platyphylla, Lindl		141
sesquipedalis, Wall.		•••	"	78	muhamila Tindl	••	127
		•••		63		••	160
		•••	"	65	emathelata Tindl	••	127
suberosa, DC unonæfolia, A. DC.	•••		"	71	2 tanuidana lindi	••	
velutina, A. DC.		•••	"	87	9 tamaria Timell		163
		•••	?"	875			156
Guazuma, Plum	•••	•••	1.	910	violacea, Lindl	"	142
					•		

Gymnandra, Pall.	Vol. Page	Gymnema Vol Page
Dorealis, Maxim.		Wallichii Wight iv. 33, 45
Cashmerianus, Royle Gymnocarpos fruticosus, Pers. iv. 712 Runavaurensis, Royle & Chois	Laurella Marina ECO	
Rinawurensis, Royle & Chois.		
Rinawurensis, Royle & Chois.	alobosa. Kurz 558	
Chois. , 560 Selleri, Maxim. , 560 Stelleri, Maxim. , 561 stelleri, Miq. , 631 stelleri, Miq. , 631	kunawurensis. Royle &	21 Min 616
Pallasti, Maxim.		
Stelleri, Hk. f. & T.	7 700	9 hatamanhallam Vara 611
Stelleri, Hk. f. & T.		11
Stellers, Maxim.		:
Stolonifera, Koch Gymnanthelia Connata	Stellani Marim 560	CO1
Gymanthelia Connuta, Aschers & Schweinf. vii 205 lanigera, Anderss. , 203 Martini, Anderss. , 204 Sp., Hk. f. & T. , 612, 632 Gymnanthemum acuminatum, Steetz , 239 Metzianum, Schultz , 234 molle, Schultz , 228 phyllokenum, Schultz , 228 reticulatum Schultz , 228 fulloces, Thw. , 620 fruitose, Thw. , 620 fruitose, Thw. , 620 fruitose, Thw. , 621 molle, Schultz , 224 molle, Schultz , 227 scandens, Steetz , 241 molleose, Thw. , 620 fruitose, Thw. , 620 fruitose, Thw. , 620 fruitose, Thw. , 620 montana, Benth. , 621 neglects, Laws. , 620 oblancelata, Laws. , 620 oblance	stalamifour Vools 550	animanalahan Miss 611
Aschere. & Sohweinf vii 205 lanigera, Anderse. , 203 Martini, Anderse. , 204 sp., Hk. f. & T. ii. 612, 632 Gymnanthenum acuminatum, Steetz , 239 Metzianum, Steetz , 239 Metzianum, Schultz , 228 molle, Schultz , 228 reticulatum, Schultz , 228 reticulatum, Schultz , 228 reticulatum, Schultz , 228 reticulatum, Schultz , 227 scandens, Steetz , 241 ruggans, Steetz , 241 ruggans, Steetz , 241 ruggans, Steetz , 241 neglecta, Laws. , 620 montanu, Wall. , 30 affine, Done. , 29 auvantiacum, Wall. , 30 Decaisneanum, Wight , 30 Decaisneanum, Wight , 34 Rothiana, Laws. , 620 rugiospani, Wight , 30 hirsutum, Wall. , 30 hirsutum, Wall. , 30 Rothiana, Laws. , 620 rugiospani, Wight , 30 Rothiana, Laws. , 620 ruguospani, Wight , 30 Rothiana, Laws. , 620 ruguospani, Wight , 30 Rothiana, Laws. , 620 ruguospani, Wight , , 50 ruguospani, Wight , , , 62 ruguospani, Wight , , , 62 ruguospani, Wight , , ,		
Martini, Anderss. , , 204 Gymnanthenum acuminatum, Ksteetz iii. 239 extensum, Steetz , 239 Metzianum, Schultz , 228 phyllolænum, Schultz , 228 phyllolænum, Schultz , 228 reticulatum, Schultz , 228 reticulatum, Schultz , 228 fruticosa, Thw. , 621 montans, Steetz , 241 vagans, Steetz , 241 vagans, Steetz , 241 vagans, Steetz , 241 vagans, Steetz , 241 oblanceolata, Laws. , 620 fruticosa, Thw. , 619 adminatum, Wall. , , 30 adminatum, Wall. , , 30 adminatum, Wall. , , 30 adminatum, Wight , , 29 clegans, W. § A. , , , 32 Finlaysonii, Wight , , , 30 lactiferum, Br. , , , , 30 lactiferum, Br. , , , , , , , , , , , , , , , , , ,	Aschers. & Schweinf vii. 205	
## Adderss ## Adderss ## Adders	lanigera, Anderss ,, 203	sp., Hk. f. & T ii. 612, 632
Commanthemum acuminatum, Steetz	M	Cymnopogon digitatus, Nees vii. 290
evensum, Steetz 239 Metzianum, Schultz 234 molle, Schultz 228 phyllolænum, Schultz 228 reticulatum, Schultz 228 reticulatum, Schultz 228 reticulatum, Schultz 227 reticulatum, Schultz 228 reticulatum, Schultz 227 reticulatum, Schultz 228 reticulatum, Schultz 227 reticulatum, Easter 619 delense, Steetz 241 neglesta, Laws 619 ovata, Laws 619 ovata, Laws 619 ovata, Laws 619 Rothiana, Laws 620 relegans, W. & A. 32 relegans, W. & A. 32	? Gymnanthemum acumina-	rigidus, Thw ,, 300
Metzianum, Schultz , 234 emarginata, Thw. i. 621 molle, Schultz , 228 fruticosa, Thw. , 619 reticulatum, Schultz , 227 scandens, Steetz , 241 scandens, Steetz , 241 neglecta, Laws. , 620 scandens, Steetz , 241 neglecta, Laws. , 619 dymnema, Br. iv. 28 oblanceolata, Laws. , 619 acuminatum, Wall. , 30 aurantiacum, Wall. , 63 aurantiacum, Wall. , 63 Rothians, Laws. , 620 columnare, Wall. , 33 Royleana, Laws. , 620 columnare, Wall. , 33 Royleana, Laws. , 620 columnare, Wall. , 33 Royleana, Laws. , 620 rug, Laws. , 620 rug, Laws.	tum, Steetz iii. 239	Gymnosporia, $W. S. A. \dots$ i. 618
molle, Schultz		
Phyllolænum, Schultz	Metzianum, Schultz ,, 234	
Reticulatum, Schultz		
Scandens, Steetz		
vagans, Steets "241 Gymnema, Br. iv 28 acuminatum, Wall. "30 affine, Done. "29 aurantiacum, Wall. "63 columnare, Wall. "33 Decaisneanum, Wight "29 elegans, W. & A. "32 Finlaysonii, Wight "34 glabrum, Wight "35 hirsutum, W. & A. "29 hirsutum, W. & A. "29 hirsutum, W. & A. "29 hirsutum, Br. "30 lactiferum, Br. "31 lactiferum, Br. "31 latifolium, Wall. "30 malayanum, Griff. "31 malayanum, Griff. "31 molle, Wall. "29 montanum, Hk. f. "31 nepalense, P Grah iii.		
Symnema, Br. iv. 28 acuminatum, Wall. 30 30 30 30 30 30 30 3	,, === 1	,,,,,,,,
Scuminatum, Wall		
affine, Done. " 29 aurantiacum, Wall. " 63 columnars, Wall. " 33 Decaisneanum, Wight " 29 elegans, W. & A. " 32 Finlaysonii, Wight " 30 hirsutum, Wight " 30 hirsutum, Wall. " 30 lactiferum, Br. " 30 lactiferum, Br. " 31 latifolium, Wall. " 30 P macranthum, Hk. f. " 31 malayanum, Griff. " 31 melicida, Edgew " 29 montanum, Hk. f. " 31 melicida, Edgew " 29 montanum, Hk. f. " 31 nepalense, P Grah iii. 668 parviforum, Wall. " 30 pergularioides, Wight & 30 parviforum, Wall. " 30 parv	Gymnema, Br iv. 28	
Rothiana, Laws		
Columnars, Wall		
Decaisneanum, Wight 29 elegans, W & A 32 rugulosa, Laws 620 rugulosa, Laws 620 rugulosa, Laws	7 77 13 " 00	
elegans, W. & A		
Salicifolia, Laws		ruis, Lanes ,, 620
Section Sect		
hirsutum, W. & A		W-11:-L: / 601
hirsutum, Wall. " 43 alatum, Wight	himana W 9. 4	
lactiferum, Br		-7-4 W: -1.4 E00
lactiferum, Br. " 31 Anders " 502 latifolium, Wall " 30 canescens, T. Anders " 508 Maingayi, Hk. f. " 31 glabrum, Arn. & Nees " 508 Maingayi, Hk. f. " 31 glabrum, T. Anders " 508 malayanum, Griff. " 31 glabrum, T. Anders " 509 melicida, Edgew " 29 hirsutum, T. Anders " 509 molle, Wall " 29 latifolium, T. Anders " 509 nepalense, P Grah iii. 668 longifolia, T. Anders " 509 nepalense, Wall iv 33 ovatum, T. Anders " 502 nitens, Bl " 31 paniculatum, T. Anders " 509 pergularioides, Wight & Garda " 32 paniculatum, T. Anders " 508 Garda " 32 sanguinolentum, T. Anders " 508 stenoloba, Hk. f. iv 33 tomentosum, T. Anders " 508 stenoloba, Hk. f. iv 33 tomentosum, T. Anders " 508 tenactssima, Spreng " 35 Gymnostemma trigyna (vide Thomsoni, Hk. f. " 32 glabrum, T. Anders " 508	la atifarum Per	, -,,,,
P macranthum, Hk. f	Instifance Dn 91	
P macranthum, Hk. f	1-4:501:n- 117-11 20	conscions T Anders 509
Maingayi, Hk. f. " 31 febrifagum, Benth. " 508 malayanum, Griff. " 31 glabrum, T. Anders. " 509 melicida, Edgew. " 29 hirsutum, T. Anders. " 509 molle, Wall. " 29 leptostachyum, Nees " 509 montanum, Hk. f. " 31 leptostachyum, Nees " 509 nepalense, P Grah iii. 668 longifolia, T. Anders. " 509 nepalense, Wall. " 31 paniculatum, T. Anders. " 502 pergularioides, Wight & Gardn. " 32 paniculatum, T. Anders. " 508 polyanthum, Wight " 508 sauguinolentum, T. Anders. " 508 stenoloba, Hk. f. iv. 33 45 tomentosum, T. Anders. " 508 stenoloba, Hk. f. " 29 venustum, T. Anders. " 508 tenacissima, Spreng. " 35 fymnostemma trigyna (vide f Thomsoni, Hk. f. " 32 fymnostemma trigyna (vide f Ynostemma " 1663	9	
malayanum, Griff. " 31 glabrum, T. Anders. " 509 melicida, Edgew. " 29 hirsutum, T. Anders. " 510 molle, Wall. " 29 latifolium, T. Anders. " 509 montanum, Hk. f. " 31 leptostachyum, Nees " 509 nepalense, P Grah iii. 668 longifolia, T. Anders. " 509 nepalense, Wall. iv. 33 ovatum, T. Anders. " 502 nitens, Bl. " 31 paniculatum, T. Anders. " 508 pergularioides, Wight & Gardan " 32 polyanthum, Wight " 508 Gardan " 33 sanguinolentum, T. Anders. " 508 stenoloba, Hk. f. iv. 33 45 tomentosum, T. Anders. " 508 stenoloba, Hk. f. iv. 32 tomentosum, T. Anders. " 508 tenacissima, Spreng. " 35 Gymnostemma trigyna (vide f Thomsoni, Hk. f. " 32 Gymnostemma " 1663	Mainmani III. f 91	fabrifacen Ponth 508
melicida, Edgew. " 29 hirsutum, T. Anders. " 510 molle, Wall. " 29 latifolium, T. Anders. " 509 mepalense, P Grah iii. 668 loptostachyum, Nees " 509 nepalense, Wall. iv. 33 longifolia, T. Anders. " 509 nitens, Bl. " 31 parviforum, T. Anders. " 502 parviforum, Wall. " 29 paniculatum, T. Anders. " 508 pardan. " 32 sanguinolentum, T. Anders. " 508 sagittatum, Thw. " 30 sanguinolentum, T. Anders. " 509 sagittatum, Wall. iv. 33 tomentosum, T. Anders. " 508 stenoloba, Hk. f. iv. 32 tomentosum, T. Anders. " 509 remeacissima, Spreng. " 35 gymnostemma trigyra " 508 remeacissima, Spreng. " 35 gymnostemma trigyra " 663		, , , , , , , , , , , , , , , , , , , ,
molle, Wall.	maliaida Edman 90	himmeters III Andrea 510
montanum, Hk. f		
nepalense, P Grah iii. 668 longifolia, T. Anders. , 509 nepalense, Wall. iv. 33 ovatum, T. Anders. , 502 nitens, Bl. , 31 panviforum, T. Anders. , 508 pergularioides, Wight & Garda. , 32 polyanthum, T. Anders. , 508 notundatum, Thw. , 30 sanguinolentum, T. Anders. , 508 stenoloba, Hk. f. iv. 33, 45 tomentosum, T. Anders. , 508 stenoloba, Hk. f. iv. 32 tomentosum, T. Anders. , 508 stenoloba, Hk. f. , 32 tomentosum, T. Anders. , 507 Gymnostemma trigyna (vide 7 Thomsoni, Hk. f. , 32 gymnostemma i. 663	montanum Ul f 21	lentestachman, Mess 500
netpalense, Wall. iv. 33 ovatum, T. Anders. , 502 nitens, Bl. , 31 paniculatum, T. Anders. , 502 pergularioides, Wight & Garda. 32 polyanthum, T. Anders. , 502 pergularioides, Wight & Garda. 32 sanguinolentum, T. Anders. , 508 sapittatum, Wall. iv. 33, 45 stenoloba, Hk. f. iv. 32 serrulatum, T. Anders. , 508 stenoloba, Hk. f. iv. 32 tomentosum, T. Anders. , 509 tenacissima, Spreng. , 35 Gymnostemma trigyna (vide 7 Thomsoni, Hk. f. , 32 Gymnostemma i. 663		longifolia, T. Anders 509
nitens, Bl. 508 parviflorum, Wall. 502 pergularioides, Wight &	nepalense, Wall iv. 33	ovatum. T. Anders 502
parviforum, Wall. 502 pergularioides, Wight & Gardn.		manianiatum /// Andana 509
pergularioides, Wight & Gardn	manufactum Wall 90.	Danishii T Andona 509
Gardn. 510 rotundatum, Thw. <		nolventhum Wight 508
rotundatum, Thw. 509 sagittatum, Wall. iv. 33, 45 Thwaitesii, T. Anders. 508 stenoloba, Hk. f. 29 tomentosum, T. Anders. 510 sylvestre, Br. 507 tenacissima, Spreng.	Claude 90	no
sagittatum, Wall. iv. 33, 45 stenoloba, Hk. f. iv. 32 sylvestre, Br. tenacissima, Spreng. 7 Thomsoni, Hk. f. 32 Thomsoni, Hk. f. 63 64 64	rotundatum Thee 20	samulatum M Andona 500
stenoloba, Hk. f. iv. 32 tomentosum, T. Anders		There is a ii M Andrea 509
sylvestre, Br , 29 venustum, T. Anders , 507 tenacissima, Spreng , 35 Gymnostemma trigyna (vide ? Thomsoni, Hk. f , 32 Gynostemma i. 663	11 70 6	hamantaanin (7) Andana (510
tenacissima, Spreng , 35 Gymnostemma trigyna (vide ? Thomsoni, Hk. f , 32 Gynostemma) i. 663	sylvestre, Br ,, 29	
? Thomsoni, H_k . f , 32 Gynostemma) i. 663	tenacissima, Spreng " 35	Gymnostemma trigyna (▼ide
tingens, W. & A ,, 31 Gymnothrix Alopecuros, Nees vii. 84	? Thomsoni, $Hk. f.$,, 32	
	tingens, W . \mathcal{F} A ,, 31	Gymnothrix Alopecuros, Nees vii. 84

Garage Haring		
Gymnothrix Vol. Page	Gynura	Vol. Page
cenchroides, R. & S vii. 84, 85	hispida, Thw	iii. 335
compressa, Brongn vii. 85	lycopersicifolia, DC.	,,
flaccida, Munro ,, 84	nepalensis, DC	,,,
hordeiformis, Nees , 85	nitida, DC	,, 333
hordeoides, Kunth ,, 86	nudicaulis, Arn	,, 334
japonica, Kunth ,, 85	Pseudo-china, DC	,, 334
longiglumis, Munro " 85	Pseudo-china, Benth.	,, 335
nigricans, Presl ,, 85	purpurascens, DC	,, 335
purpurascens, Sw ,, 85	sarmentosa, DC	,, 335
Thouarii, Beauv ,, 88		ii. 333, 334
Thouarii, Ham ,, 87	sinuata, DC	iii. 334
Thouarii, Steud , 88	Walkeri, Wight	, 337
? sp., Wall vii. 84, 85	Gypsophila, Linn	i. 216
Gynaion vestitum, A. DC iv. 139	cerasticides. D. Den	,, 217
Gynandropsis, DC i. 170	erinacea, Boiss	, 216
pentaphylla, DC , 171	redifolia, Kurz	" 217
Gynocardia, $Br.$ i. 195	Stewartii, Thoms	, 216
odorata, Br ,, 195	tibetica, Hk. f. & T	, 217
Gynocephalum bracteatum,	Vaccaria, W. & A	" 217
Tréo i. 592	Gyrandra laurina, Wall.	▼. 353
giganteum, Tréc ,, 591	Gyrinops, Gaertn	v. 199
oblongum, Tréc " 592	Walla, Gaertn	v. 199, 862
palmatum, Tréo ,, 592	sp., Benth	▼. 200
Gynochthodes, Bl iii. 160	GYROCABPEÆ	ii. 443
corracea, Miq ,, 160	Gyrocarpus, Jacq	ii. 461
macrophylla, Kurz ,, 160	acuminatus, Meissn.	,, 461
sublanceolata, Mij ,, 160	americanus, Jacq	,, 461
Gynoon Heyneanum, W. & A. v. 323	asiaticus, Willd	,, 461
Jussieuianum, Wight ,, 320	Jacquini, Roxb	,, 461
minidam A Tman 290	rugosus, R. Br	,, 461
terianders W. & A 290	sphenopterus, R. Br.	,, 461
Gynopachis axilliflora, Miq. iii. 112	Gyrostachys australis, Bl.	vi. 102
ablamanta Win 119	dy section go and the contract of	
Gynopogon breviflorum,	Haasia cuneata, Nees	v. 125
Kurz iii. 637	incrassata, Nees	,, 126
lamacolatera Vana 625	nitida, Meissn	
. 11 . * 1.11	oppositifolia, Meissn.	v. 124
O	peduncularis, Nees	v. 126, 144
COO	Wightii, Nees	v. 124
J Di 699	Habenaria, Willd	vi. 131
madeta Dab & Ula & 691	acuifera, Wall	, 146
	acuminata, Thw	" 199
	affinis, Wight	140
0 1 71	m · To to	160
	Aitchisoni, Rchb. f.	150
	andamanica, Hk. f	194
	1	185
_ ,,,	arcusts, Hk. f	" 199
Gynura, Cass iii. 333	arietina, Hk , f	150
angulosa, DC , 334	aristata, Hk. f	7 149
aurantiaca, DC iii. 333, 335	avana, Hk. f	" 199
auriculata. Cass iii. 335	barbata, Wight	156
auriculata. Clarke ,, 335	bicornuta, Hk. f.	*** "
bicolor. DC ,, 335	brachyphylla, Aitch.	& 150
ecalyculata, DC ,, 336	Hemsl	, 152
Finlaysoniana, DC ,, 335	brachyphylla, Rohb. f.	,, 151
fatens, DC ,, 333	Brandisii, Hk. f	, 162
glabrata, Clarke ,, 335	breviloba, Hk. f	,, 159

Habenaria	37-1 3	D	Habenaria	W-1	D
	Vol. 1 Vi.	148			Page 158
		166			162
O 1 1 4 4 7 1 11		139	lambagamlam III. f	, "	154
chlorina, Par. & Rehb. f. vi.	147	1074	Trust common TT and a	,,	166
oniorius, rar. g Neno. j. vi.	. 17/,	144		,,	140
	vi.	144		,,	
commelinifolia, Wall		143	T	,,	185
concinna, Hk. f	"	155		,,	146
constricts, Hk. f	"	161		•• ,,	166
corymbosa, Par. & Rchb. f.		136			166
crassifolia, A. Rich vi.			lougicalcarata, A. Rich. v	i. 14]	1, 197
orinifera, Lindl	vi.	1	longicorniculata, Grah	Vi	. 141
cubitalis, Br	- "	157	longicornu, Lindl v		
	141,			., v i	
	165,	197		,,	133
densa, Wall	٧i.	153	lutea, Benth	,,	164
dichopetala, Thw	"	136	macroceratitis, Rottl	,,	141
digitata, Lindl	"	134		,,	134
diphylla, Dals	"	151	1 1 1 771 4	,,	159
ditricha, Hk. f	"	151		"	143
dolichostachya, Thw	"	135	Mandersii, Hemsl. & Coll	. "	146
elliptica, Wight	"	147	marginata, Coleb	. "	150
ensifolia, Lindl		137	1 4 4 7 7		166
Contracts Wildlife	"	139	monophylla, Coll. & Hem	, ,,	143
A 171. /	"	150	montana, A. Bich	18(. ,, ri 190	
	"	135			
foliosa, A. Rich	"	149		ri. 141	
furcifera, Lindl	"	144	36	vi	
furfuracea, Hk. f	"			,,	144
fusifera, Hk. f	"	147		,,	154
galeandra, Benth	"	163		,,	154
Gardneri, Hk. f	"	158	Orchidis, Hk. f	,,	142
geniculata, D. Don	"	138	ovalifolia, Wight	,,	149
Gerardiana, Wall	"	187		,,	154
Gibsoni, \underline{Hk} . \underline{f}	13	185		,,	16 l
gigantea, D. Don	"	187	pectinata, D. Don	,,	137
gigas, Hk. f	**	160		,,	138
glabra, A. Rich	"	148	pelorioides, Par. & Rchb.	f. "	166
goodyeroides, D. Don	"	161	peristyloides, Wight	,,	156
goodyeroides, Hook	"	162	Perrottetiana, A. Rich	,,	164
gracillima, $Hk. f.$	1)	163	plantaginea, $Lindl$.	,,	141
gracilis, Coleb	"	166	platyphylla, Spreng	"	140
graminea, Lindl	33	151	1	"	139
graminea, A. Rich	"	150	T)!!! TTL #	,,	159
grandiflora, Lindl	"	136			· 150
Griffithii, Hk. f	"	197		,,	145
hamigera, Griff		149	- mhassans Tindl		144
Hemiltoniana, Hk. f	"	160			186
Helferi, Hk. f		164	nomidammia III. d		152
77	"	148		• • • • • • • • • • • • • • • • • • • •	145
industrialia D. Dan	**	138	Dichamiana Winks	,,	139
J Al Th Al.	"	164	1 - 1 - 1 - 11 A	,,	160
	"	152		,,	
Jerdoniana, Wight	"		makum didalim Tim 41	,,	146
Josephi, Rohb. f	"	152		,,	136
khasiana, Hk. f	29	151	Schischmareffiana, Cham.		130
Kingii, Hk. f	"	144		,,	142
lacertifers, Benth	"	168	secundiflora, Hk. f	. ,,	165
laciniata, Dals	"	185	sikkimensis, Hk. f	,,	155
latifolia, Lindl	"	140	spatulæfolia, Par. & Rchb	. f. "	145

Habenaria	V ol.	Page	Halogeton	V	ol. Page
stenantha, $Hk.f.$	▼i.	153	glomeratus, C. A. Mey.		v. 20
stenopetala, $Lindl$,,	134	tibeticus, Bunge	•••	,, 20
P stenopetala, Lindl	,,	145	Halophila, Thouars		v. 663
	,,	156	Beccarii, Asch	1	vi. 570
Cl4122 T77 C	,,	158	ovalis, Hk. f		v. 668
suaveolens, Dalz. & Gibs		140	ovata, Gaud		Las
		148	stipulacea, Asch		" 664
	••• ,,	137	Halongum Stant	2	28, 42
C. 47 . 10 11 A	••• ,,	152			rii. 326
Acuaricannia Wall	,,		mucronatum, Stapf		
4	• • • • • • • • • • • • • • • • • • • •	149	17 - 1		i. 430
	"	150	Haloragis, Forst	1	iı. 430
tipulifera, Par. & Rchb.	J. "	157		•••	,, 412
torta, $Hk. f.$,,	159		•••	,, 430
travancorica, Hk . f .	,,	135	oligantha, Arn	•••	,, 43
	,,	138	oligantha, W. & A	•••	,, 433
triflora, D. Don	,,	142	scabra, Benth		,, 430
triflora, D. Don triflurcata, Hk. f	,,	148	tenella, Brongn		,, 430
	,,,	135	tetragyna, Hk. f		,, 43 0
	,,	137	97 7		i. 6 81
	,,	166			v. 15
:a C=:ec		167	C : M 17 : 10 TT1		10
	,,	165	1		" 16
	,,	146	D		" 15
	,,	150	1 ' 2		" 15
Winhtil Waim	,,			•••	" 16
	,,	162			" 16
zosterostyloides, Hk. f		155	Stocksii, Hk. f		,, 15
_sp., Griff		138	Thomsoni, Bunge	•::-	, 16
	1.	83	Hamamelidea, Griff. ii.	427,	A. 190
ferruginea, Hk. f. & T.	,,	83			i. 425
oxyantha, Hk. f. & T	,,	83	Hamamelis chinensis, Br.		
Haemaria, Lindl v discolor, Lindl	i. 101,	179	Hamatris triphylla, Salisb.	. v	i. 2 89
discolor, Lindl	vi.	101	Hamiltonia, Rowb	ii	ii. 197
Hæmatocarpus, Miers	i.	106			,, 197
comptus, Miers (lapsu F	.) "	106			,, 197
incusus, Miers (lapsu F	.) "	106		-	, 197
Thomsoni, Miers		106		-	,, 198
Hæmatorchis altissima, Bl.	", ▼i.	89	Hanguana, Bl	v	"
Hæmatospermum cuneatum		00			i. 521
		456			ri. 521
	▼.	455	Ronthomiana Schott		501
neriifolium, Wall	,,		Benthamiana, Schott	••• ;	., 521
. 71 . 10 . 111	,	455	Brownii, Hk. f		" ~
saucinum, Balli	"	455	Hapalocarpum indicum, M	ıq. ı	F00
HÆMODORACEÆ	vi.	264	vesicatorium, Miq	:	, 569
Lialonia	iv.	130	Hapatosa Læftingiæ, Wall	1	
	,,	130	Haplanthus, Nees	1	7. 506
Perrottetii, Griseb	,,	130	Phygrophiloides, T. And	ers.,	, 507
sibirica, Borckh	,,	130	nilgherrensis, Wight .	,	
Halimocnemis sulphurea,Mo	q. V.	20	plumosa, T. Anders	,	, 507
Hallia hirta, Willd	ii.	65	tener, Nees	,	, 502
. 117.11.3	. ,,	153		,	KO7
	••	220	4 11 1 77	. ,	່ ະດຣ
	,, .: ∀.	19	. TTL A A M	-	507
·		19			i. 669
		19	50 11 37		000
violacea, Bunge HalodendronThouarsii,R. &	Q :-		777 1 4 1	-	660
				,	,
Halodule australis, Miq.			Haplotanis, see Aplotanis .		
Halogeton , C . A . Mey	▼.	20	HAPLOZYGIA	ii	. 🗝

Vol.	Page	Hedera	Vol.	
Hardwickia, Roxb ii.	270	parviflora, Champ	. ii.	733
binata, $Roxb$,,	270	polyacantha, Wall:	, ,,	735
pinnata, Roxb ,,	24.0	racemosa, Wight	• ,,	729
	419	rostrata, Wight	• ,,	729
nana, Griff ,,	420	subcordata, Wall	. ,,	724
oblongifolia, Griff "	419	terebinthacea, Vahl	, ,,	730
Harlandia bryonioides, Hance ii.	625	terebinthacea, Wall	, ,,	729
Harnieria dimorphocarpa,		tomentosa, Ham	. ,,	728
Solws iv.	581	trifoliata, W. & A	. ,,	724
Harpullia, Rosb i.	691	undulata, Wall	. ,,	738
cupanoides, Rosb ,,	692	Vahlii, Thw	. ,,	730
imbricata, Thw "	692	venosa, Wall		729
Harrachia speciosa, Jacq iv.	492	_ Wallichiana, Dalz. & Gibs		730
Harrisonia, Br i.	519	HEDEREA:		721
Bennetii, Hk. f ,,	519	Hederopsis, Clarke	. ii.	789
Brownii?, Kurz ,,	519	Maingayi, Clarke		739
Hartighsea Alliaria, Arn ,,	548	Hedraiostylus corniculatus		
Gobara, W. & A ,,	547	Hassk		464
_ramiflora, Griff ,,	549	Hedycarpus cauliflora, Hansi	. v.	
Hartwegia Nimmonii, Dalz. vi.	336	lanceolatus, Miq	. ,,	368
Hasskarlia leucacantha, Walp. vi.	485 .	malayanus, Jack	. ,,	374
Hastingia coccinea, Sm iv.	596	Hedychium, Kæn	vi.	
scandens, Roxb ,,	596	acuminatum, Rosc	. ,,	227
Hebradendron cambogioides,		album, Ham		225
Grah i.	265		. 231	
Choisyanum, Chois ,,	265	angustifolium, Wall	. vi.	231
Wallichii, Chois "	265	aurantiacum, Wall	. ,,	232
Heckeria subpeltata, Kunth v.	95	aureum, Clarke	. ,,	22 9
Hedeoma nepalensis, Benth. iv.	647	barbatum, Wall	. ,,	231
Hedera, Linn ii.	739	bicornutum, Wall	. ,,	227
aculeata, D. Don "	738	carneum, Roso	. ,,	232
acuminata, Wight , ,,	727	cernuum, Wight	. ,,	226
æsculifolia, Wall ,,	738	chrysoleucum, Hook	. ,,	226
? Aralia, Jack "	732	coccineum, Ham	. ,,	231
confluens, Wall ,,	732	coccineum, Lindl		231
disperma, DC "	738		. 231	
elata, Ham "	728	coronarium, Karn	. vi.	
emarginata, Moon "	72 9	orassifolium, Baker	. ,,	228
ezaltata, Thw "	730	densiflorum, Wall	. ,,	227
ferruginea, Wall "	732	elatum, Br	. ,,	232
floribunda, Wall ,,	737	elatum, Clarke	. ,,	231
fragrans, D. Don "	725	ellipticum, Ham	. ,,	228
glauca, Wall ,,	724	Elwesii, Baker	. ,,	226
glomerulata, D.C ,,	737	fastigiatum, Wall	. ,,	228
Hainla, Ham "	735	flavescens, Carey	. ,,	226
Helix, Linn "	739	flavescens, Lindl	. ,,	227
Helix, Linn i.	663	flavescens, Lodd	. ,,	227
heterophylla, Wall ii.	731	flavum, Wall	. ,,	226
hypoglauca, Hance i.	663	flavum, Roxb	. ,,	226
Jackiana, G. Don ii.	734	Gandasulium, Ham	. ,,	225
japonica, Jungh "	733	Gardnerianum, Rosc		230
Leschenaulti, W. & A "	724		i, 231	
mollis, Wall "	731		. vi.	
obovata, Wight ,,	730	Gomezianum, Wall	. ,,	228
Povata, Wall "	734	gracile, Roxb	. ,,	229
palmata, Wall "	732	gracile, Wall	. ,,	229
parasitica, D. Don "	724	l gratum, Wall	. ,,	232
-				

Hodeshies.		_	. ** *		
Hedychium		Page	Hedyotis	•••	. Page
Griffithianum, Wall.	▼í.		capillipes, Schlecht.	iii.	
heteromallum, Lindl.	,,	230	capitata, Bedd	,,	52
Hookeri, Clarke	,,	~230	capitellata, Wall	,,	· 56
longicornutum, Griff.	,,	228	capituliflora, Miq	٠ ,,	58
longifolium, Rosc	,,	231	carnosa, Dalz. & Gibs.	,,	74
luteum, Herb. Calcutta	,,	232	cephalophora, Br	,,	56
marginatum, Clarke	,,	226	cinerec-viridis, Thw.	,,	55
maximum, Rosc	,,	226	coerulea, W. & A	,,	60
pallidum, Regel	,,	2 3 0	cærulea, Korth	,,	58
Prophetæ, Ham	,,	225	congesta, Br	,,	61
Roscoei, Wall	,,	231	connata, Wall	,,	62
Roxburghii, Sieb	,,	227	corymbosa, Wall	,,	51
scaposum, Nimmo	,,	224	costata, Br	,,	59
Sieboldii, Wall	,,	227	costata, Kurz	,,	58
speciosum, Wall	,,	231	cyanantha, Kurz	,,	60
spicatum, Ham	,,	227	cyanescens, Thw	.,	62
spicatum, Lodd	,,	225	cymosa, Thw	•••	50
squarrosum, Ham	,,	231	Augustus Da	••	72
stenopetalum, Lodd.		231		,,	72
sulphureum, Wall		226) 3 D 0.0	,,	71
41 '0 17	,,	230	3 / 1 - 4	,,	67
m° 1 77′	,,	230		.;. "	67
421 7 107.11	,,	227	dichotoma, Wall	,,	65
	,,	226	diffusa, Willd	,,	
urophyllum, Lodd	,,	226	elegans, Wall	,,	53
venustum, Wight	,,		Pelongata, Br	••• ,,	68
villosum, Wall	,,	228	evenia, Thw	n	50
sp., Griff	vi. 225,		extensa, Br.		65
HEDYOTIDER	iii. 18		Finlaysoniana, Wall.	iii. 8	
Hedyotis, Linn	iii.	49	flavescens, Thw.	iii.	
acutangula, Champ.	,,	53	fatida, Dalz. & Gibs.	,,	74
affinis, R. & S	,,	67	fruticosa, Linn	,,	42
affinis, W. & A	,,	72	fruticosa, Retz	,,	201
alata, Koen	,,	70	fulva, Hk . f	,,	58
albo-nervia, $Bedd.$,,	55	jusca, Ham	,,	68
alsinæfolia, Br	,,	64	galioides, Wall	,,	53
andamanica, Kurz	,,	64	Gardneri, Thw	,,	53
angustifolia, Cham. & Sc	hl. "	60	glabella, Br	,,	61
angustifolia, Wall	,,	67	\mathbf{glabra}, Br	,,	59
approximata, Br	,,	60	gracilis, Wall	,,	68
argentea, Wall	,,	61	graminicola, Kurz	,,	64
arguta, Br	,,	67	graminifolia, Linn. f.	,,	69
articularis, Br	,,	51	Griffithii, $Hk.f$,,	58
aspera, Bedd	,,	68	Helferi, Hk. f))	58
aspera, Heyne	,,	68	Heynii, Bedd	,,	. 67
attenuata, Willd	,,	67	Heynii, W. & A	,,	65 .
Auricularia, Linn	,,	58	hirsutissima, Bedd	,,	55
axillaris, Gardn	,,	54	hispida, Retz	,,	60
Beddomei, Hk. f	,,	52	hispida, Roth	,,	71
bifora, Linn	•••	70	inamœna, Thw	,,	61
biftora, Roth	••	64	inamæna, Thw	,,	55
	••	70		••	71
biflora, Wall	,,	56	ingrata, Wall intermedia, W. & A.	••• ,,	64
borreroides, Champ	,,	60	lancifolia, Dalz. & Gil	,,	73
brachiata, Miq	,,	66			73
brachiata, W. & A	,,	64	Lawsoniæ, W. & A	••• ,,	56
Burmanniana, Br	,,	52		···· . "	51
buxifolia, Bedd	,,		lentiginosa, Bodd	••• ,,	51
calycina, Wall	,,	73	? Leschenaultiana, DC.	··· , n	OT

Hedyotis	V	nl. Page	Hedyotis		Vol.	Page
Leschenaultiana, W. &	A. ii	ol. Page ii. 72	Rheedii, W. & A		iii.	Page 73
Tananationa Ani		, 52	Richardiana, Arn		90	75
12		" (8	rigida, Miq		"	60
7 de diamento Trans		,, 63	rotundifolia, DC		,,	66
1! D1		,, 59	rotundifolia, Ham		"	70
1.5 A = 107 11		,, 58	rugulosa, Korth		"	48
limaida, Caide		,, 67	scaberula, Hk. f	•••	,,	50
Manage 1771. A		" 5 0	scabra, Wall		,,	62
		" 54	scandens, Rozb		,,	57
		,, 54	scapigera, Br		,,	70
		,, 49	serpyllifolia, Poir		"	66
, m		" 5 3	spergulacea, Kurz	•••	,,	70
		v. 287	stipulata, Br	•••	,,	63
	i	ii. 69	stipulata, Br	•••	,,	71
membranacea, Thw		,, 54	Stocksii, Hk. f. & T.	•••	,,	67
merguensis, Hk. f		,, 62	stricta, Wall	•••	,,	68
minima, Heyne	iii	i. 69, 70	stylosa, Br	•••	,,	51
mollis, Wall	i	i i. 5 7	subcarnosa, Wall	•••	"	62
monocephala, Br		,, 6 3	subtilis, Miq	•••	"	74
monosperma, Wight		,, 75	swertioides, $Hk. f.$		9)	51
multicaulis, Schldl	•••	,, 59	tenella, Miq	•••	,,	74
mysurensis, Wall	•••	" 7 5	tenelliflora, Bl	•••	,,	60
Neesiana, Arn	•••	,, 61	tenuiflora, Schlecht.	•••	,,	74
	•••	,, 58	Thomsoni, Hk. f	•••	,,	63
nitida, $W. \delta^* A. \dots$	•••	,, 61	Thwaitosii, Hk. f	•••	"	54
nodiflora, Wall	••• ;	,, 54	travancorica, Bedd.	•••	"	55
	•••	,, 54	trinervia, W. & A	•••	,,	66
	••• ;	,, <u>7</u> 0	tubularis, Br	•••	,,	74
	••• ;	,, 75	tubularis, Wall	•••	,,	73
	•••	" 75	ulmifolia, Wall	•••	"	59
	••• ;	,, 51	umbellata, Lamk	•••	*7_	66
	٠. i	,, 66	uncinella, Hk . S Arn.		iii. 50	
		,, 52	urophylla, Wall	•••	iii.	72
	••• ;	,, 70	venosa, Korth	•••	,,	59
	•••	,, 72	verticillaris, W. & A.	•••	**	56
	•••	,, 69	vestita. Br	•••	,,	58
	•••	,, 59	villosa, W. & A	•••	"	58 57
	••• ;	,, 60	viscida, Bedd	•••	"	57 57
		,, 56	volubilis, Wall	•••	"	55
		" 57	Walkerii, Arn	•••	"	5 3 -
		,, 65 ., 58	Wallichii, Kurz Wightiana, Wall	•••	"	75
			TT	•••	ii.	58
		" 5 1	Hedysares	•••	ii.	145
		" 7N	adhærens, Poir			164
		66	alatum, Roxb	•••	"	163
		" er	Alhagi, Linn	•••		145
		, EO	alopecuroides, Roxb.	•••	"	156
337-11		" 60	arboreum, D. Don	•••	"	156
		" 7A	arboreum, Roxb	•••	"	161
		. E0	articulatum, Roxb		"	169
T		70	astragaloides, Benth.		"	146
T07-11		, 73	biarticulatum, Linu.	•••	"	168
		,, 69	bijugum, Klein	•••	"	141
. 701		, 64	bracteatum, Hb. Madr.	•••	"	159
	•	, 65	bracteatum, Roxb	•••	"	227
. 7		,, 42	bupleurifolium, Linn.	•••	"	158

Hedysarum	V ol	Page	Hedysarum	Vol	Page
cachemirianum, Benth	i i.	146	recurvatum, Roxb;	22	164
cajanifolium, H. B. K	"	161	reniforme, Linn		173
capitatum, Burm	"	171	reniforme, Lour		154
caudatum, Thunb		163	reptans, Roxb		178
Cephalotes, Roxb		162	retroflexum, Linn		170
collinum, Roxb		168	retusum, D. Don		171
conicum, Poir		171	Rottleri, Spreng		164
conjugatum, Willd		148	rotundifolium, Vahl		92
crinitum, Linn		155	Rosburghii, Spreng		164
cylindricum, Poir	"	158	rugosum, Willd		159
dichotomum, Willd		169	sambuense, D. Don		167
diffusum, Roxb		164	sennoides, Willd sericeum, Thunb		152
diffusum, Willd	"	169	sericeum, Thunb	,,,	142
diphyllum, Linn	, ,,	147	sikkimense, Benth		145
erinaceum, Poir		92	siliquosum, Burm	, ,,	171
Falconeri, Baker	,,	146	sororium, Linn	. ,,	158 .
floribundum, D. Don	"	167	sparteum, Burm	. , , ,	140
gangeticum, Linn	"	168	spirale, Schwartz		164
Gibsoni, Grah	-	140	stipulaceum, Burm		178
glumaceum, Koen		159	strobiliferum, Baker		146
gramineum, Retz		158	strobiliferum, Linn		227
gyrans, Linn		174	styracifolium, Linn		170
gyroides, Roxb		175	styracifolium, Roxb		15 9
hamatum, Burm		148	tenellum, D. Don		174
hamatum, Heyne		157	tiliæfolium, D. Don		168
hamosum, Roxb		156	tomentosum, Tuunb		143
heterocarpum, Linn		171	triflorum, Linn		178
heterophyllum, Willd		173	triquetrum, Linn		168
junceum, Linn. f		142	tuberosum, Roxb		197
kumaonense, Benth	,,	145	umbellatum, Liun		161
laburnifolium, Poir	,,,	16 8	umbellatum, Roxb	,,,	162
lagenarium, Roxb	,,	152	vaginale, Linn	99	158
lagopoides, Burm		156	varium, Roth	. ,,	158
latebrosum, Linn		65	Vespertilionis, Linn	. ,,	154
latifolium, Roxb	,,	169	viscidum, Linn	• • •	154
laxiflorum, Benth	,,	146	Wallichianum, Spreng	. ,,	167
lazum, Spreng	"	165	Hegetschweilera pulchella,		
lineatum, Linn	, ,,	228	Regel	ii.	158
longifolium, Rottl		159	Hekaterosachne elatior, Steud		
maculatum, Linn		168	Hekorima candida, Kunth		
microcalyx, Baker	, ,,	147		. vi.	627
moniliferum, Linn	,,,	157	Heleochlon, Host	vii.	285
mucronatum, Bl	,,	161	alopecuroides, Duthie	• ,,	286
Neli-Tali, Roxb	"	151	dura, Boiss	10,	286
nummularifolium, DO	"	140	schonoides, Host		280
nummularifolium, Linn. i	i. 92,	, 158	HELIANTHOIDE# iii.	222,	803
obcordatum, Poir	ii.	154		. iii.	
orbiculatum, Bottl	, ,,	174	Helichrysum, Gaertn		
ormocarpoides, Desv	,,,	164		. 290,	
patens, Roxb	, ,,	171	Pelegans, D. Don		280
pictum, Jacq	,,	155	Hookerianum, DO	• ,,	291
polycarpum, Lam	,,,	171	leptophyllum, DC	•••	285
prostratum, Linn	. ,,	94	nepalense, Spreng		280
pulchellum, Linn	,,,	162	Notonianum, DC	•	284
punctatum, Rottl	, ,,	226	stoloniferum, D. Don	-	280 291
purpureum, Boxb		171	Wightii, Clarke		
quinquangulatum, Rozb	. ,,	169	Helicia, Lour	. ▼.	189

Helicia	17.01	Dama	Heliotropium	· Val	Page
		Page 190		i♥.	
		191	1		150
		190		··· , "	151
	•••	189	7 7 7 7 4		150
	. ,,	189	1		150
		191	1		152
		191	1 1 7 . 7 .		148
loranthoides, Presl		191	1 200 - 1 - 1 22 0 4		149
	••	191	12 * 42 * * * 4 * 4 * 4		149
		190	1	•••	150
petiolaris, Benn		190	A 24 1.	• • • • • • • • • • • • • • • • • • • •	150
pyrrhobotrys, Kurz		191	T :	.,	150
robusta, Wall	• • • • • • • • • • • • • • • • • • • •	191	1 6.12-2 Ď		152
robusta, Bedd	-	191			151
		189	1 .1.1.11 TI		151
salicifolia, Presl		191		•••	150
terminalis, Kurz		190	1 - 3: T	"	152
travancorica, Bedd	-	191	70 Y . 1		150
HELICTEREE		353	lasiocarpum, Fisch. & Me		150
TY-12-4 7 '		365) / I TO	•	152
A 2 8 - 12 - T 1		365	11. Italiana Tahan		151
carthagenensis, Wall		366	Zustimm Addah	,,	148
-1	-	365	7 . 4 Th =	,,	148
alammata Wall		365	l	. ,,	149
lal		366	Later Date	• • •	149
ananimeration Wall		366		,,	152
1249 III II		366	117-11	,,	152
T		365	1	"	150
1 1.1.1.1.100		365	1 10	"	151
7		366	ataumtum D Don	,,	150
1: f-1: W7-11		366	1 1 04 1 .	•• ,,	149
allaman Wall		366		•• ,,	150
obtusa, Wall	• • •	366	D.	••	151
	••	366		• • • • • • • • • • • • • • • • • • • •	148
Roxburghii, G. Don	-	365	Transfer laderen Domb	••	153
N-1-1		366	Tamalana Tamala		150
? spinulosa, Wall		366	7 1 . 4 . 1	"	150
		366	The contract of the back	"	150
	-	365	Dan's	,,	152
Helie atalantioides, Roem		508		,,	152
Heligme javanica, A. DC		650	Dassland Taken	,,	151
Rheedei, Wight		650	D L	,,	153
spiralis, Thw		650	noohumus Data	• • •	152
Helinus, E. Mey		644	Calman himman I adalı	,,	148
lanceolatus, Brandis		644	1	,,	149
Heliophytum indicum, DC	. iv.		727.27		151
velutinum, DC		152	1 .4.1		149
Heliopsis platyglossa, Cass		308		• • • • • • • • • • • • • • • • • • • •	149
Heliospora flavescens, Jack	c iii.	127	O auditas O assessed		150
HELIOTROPIEE		134		•• ,,	151
Heliotropium, Linn		148	Anna a Annum Daim		150
affghanum, Boiss		150		,,	150
anisophyllum, Beauv		152	and different Takes	,,	146
bracteatum, DC		151		,,	148
brachuicum, Stocks		148	and and Dames		151
brevi olium, Wall		151		••	158
Brocchianum, Vis	• • • • • • • • • • • • • • • • • • • •	150			152
	٠,,	100		,,	102

Vol. Page	Hemicarex	Vol. Page
Helittophyllum javanicum, Bl. v. 191		vi. 712
HELLEBOREE i. i. 1	sp., Benth Hemicarpha Isolepis, Nees	vi. 663
Hellenia-alba, Willd vi. 253	Hemichoriste montana, Nees	i v. 525
Allughas, Willd " 254	Hemicyclia, W . S A	v. 337
aquatica, Horan ,, 256	andamanica, Kurz	,, 338
grandistora, Retz ,, 250	elata, Bedd	,, 339
scabra, Bl " 256	Gardneri, Thw	,, 338
Helmia bulbifera, Kunth vi. 295	lanceolata, Thw	,, 338
? domona, Kunth ,, 289	sepiaria, W. & A	,, 337
P tomentosa, Kunth ,, 289	sumatrana, Muell	" 338
Helminthospermum glabrescens,	venusta, Thw	,, 339
	Wightii, Hk. f	" 339
scabridum, Thw , 486	Hemidesmus, Br	iv. 4
Helopus acrotrichus, Stend. vii. 20	indious, Br	"5
annulatus, Nees ,, 20	pubescens, W. & A	;, 5
lævis, Trin ,, 20	Wallichii, Miq	<u>,,</u> 5
pilosus, Trin ,, 20	Wallichii, W. & A	,, 8
trichopus, Hochst ,, 35	Hemigraphis, Nees	
Helosciadium ? Heyneanum,	confinis, T. Anders	,, 423
DC ii. 684	dura, T. Anders	,, 422
? pubescens, DC ,, 688	ebracteolata, Clarke	443.4
P tenerum, DC " 686	elegans, Nees	
P trifoliatum, DC " 688	elegans, T. Anders	
Wallichianum, Miq ,, 688	flacoida, Clarke	
HELOSIDEÆ v. 237	flava, Kutz	
Helwingia, Willd ii. 726	glandulosa, T. Anders	
himalaica, Hk. f. & T ,, 726	glaucescens, Clarke	4.35
populifolia, Spreng ,, 727	Griffithiana, T. Anders	
rusciflora, Willd " 726	hirta, T. Anders	46161
Helygia javanica, Bl iii. 650	latebrosa, Necs	400
Hemarthria, Br vii. 152	Pavala Kurz	
agmanaia (Trim	Pavala, Kurz quadrifaria, T. Anders	,, 425
anudiculata Stand 150	rupestris, T. Anders	,, 424
compressa, Kunth ,, 153	venosa, Clarke	,, 423
coromandelina, Steud ,, 153	Hemigymnia Macleodii, Griff.	
fasciculata, Kunth ,, 153	Hemigyrosa, Bl	
Hamiltoniana, Steud ,, 154	carescens, Thw. i. 671,	679, 685
laxa, Steud ,, 153	deficiens, Bedd i.	671, 685
? perforata, Kunth ,, 158	longifolia, Hiern	
protensa, Steud , 153	trichocarpa, Thw	
Pagaingta Dübas 139	Hemiorchis, Kurz	vi. 206
am Wall 159	burmanica, Kurz	~~-
HEMEBOCALLE vi. 300	Hemiphractum oxyandrum,	
Hemerocallis, Linn vi. 326		i. ·313
distisks Di noc		iv. 289
folgo Tim 000		,, 289
	l	vi. 167
Hemiadelphis polysperma,	calophylla, Par. & Rchb. f.	
Nees iv. 406	cordifolia, Lindl	
Hemiandrina borneensis, Hk.f. ii. 47	Hemisacris gonatodes, Steud.	vii. 336
Hemicarex, Benth vi. 694, 698	Hemisteptia lyrata, Bunge	
		iv. 357
		~ ~ ~
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	cinerea, Spreng	051
1 7 11	frutescens, Spreng	"
	grandiflora, Dietr	" 005
pygmæa, Clarke ,, 696	grandifolia, Dietr	"
trinervis, Clarke vi. 696, 712	granusjona, Dioec	,, 550

Henckelia	Vol	. Page	Heptapleurum	Vol	. Page
incana, Spreng	i v .		Wallichianum, Seem	ii.	
	iv. 346	3, 358		ii.	711
oblonga, Spreng	iv	. 347		4,	
oppositifolia, Dietr	,,	286	V	,,	715
	,,	846		,,	713
	,,	347		,,	714
	,,	357		,,	712
	,,	352	candicans, Wall	,,	714
	,,	285		,,	713
	,,	358		,,	716
	,,	347		,,	713
	,;	358		. ,,	716
Henosis, Hk. f. v. 771;	71. 177	, 189		. ,,	
longipes, $Hk. f.$ v. 77			grandiflorum, Dalz. & Git	98. ,,	716
1 10-11 TO	▼.	232	hirsutum, Edgew	,,	713
	,,	234		"	715 712
	,,	234		,,	714
77- 4 0	,,	233 232	1 1	15	713
granulata, Hk . f . $& T$. heterantha, Hk . f . $& T$.	,,	233		,,	714
heterantha, Hk. f. & T.		235 227	i	. ,,	716
		232	l Dimin Dala 6 Cita	,,	717
	,,	233		. ,,	712
Lobbiana, A. DC ? philippinensis, A. DC	••• ,,	233	1 - ver 11	. ,,	715
		234	1 ~ ` ^		716
spicata, Bl umbellata, Bl	v. 222		Sprengelianum, Dalz.& Gil	"	715
	v.	233			716
Henslowia affinis, Planch.		571	1	•••	713
1 · 107 11 ·		574	m		711
		574	tomentosum, Dalz. & Gibe	. "	689
** 1 999 11	,,	574		• ,,	717
	,,	574	1 4	. ,,	712
	,,,	574			712
7 7 77 11	`,,	574	sp., Hk. f. & T. ii. 719	2, 715	, 716
- a · m	,,	574		. i.	362
77	ï.	8	attenuata, Wall		, 517
	ii.	727		. i.	863
	,,	731	Fomes, Wall	. ,,	363
capitatum, Seem	ii. 781	, 732	littoralis, Dryand	. ,,	363
Cephalotes, Clarks	ii.	731	macrophylla, Wall	٠,,	368
	,,	728	minor, Roxb	. ,,	363
	,,	729	Papilio, Bedd		36 3
	,,	729		. Vi.	~~~
	,,	780	alba, Retz		253
	,,	728	Allughas, Retz		254
	,,	728	aquatica, Retz	: "	256
	•••))	731	Hermannia alnifolia, Wall	•	322 354
	,,	728	Hermanniez		
	,,	728 7 3 0		i. 128 . vi .	129
	,,	730	angustifolium, Benth		130
	,,	729	congestum, Lindl constrictum, Lindl		161
	,,	729	Th41.1		130
	,,	730	A-11 7:- 37	• ,,	129
	** ;;	730	goodyeroides, Lindl		161
	., ,,	729	gramineum, Lindl		181
	,,	730	grandiflorum, Lindl		129
** ************************************	,,	,		- 77	

Wayminin	
Herminium Vol. Page	Hetzeria Vol. Page
Hamiltonianum, Lindl vi. 160	longifolia, Benth vi. 109
Josephi, Rohb. f ,, 129	ovalifolia, Benth ,, 115
longicruris, Wright, vide	rubens, Benth ,, 115
Aceras ,, 129 Monorchis, Br ,, 128	Heterocanscora Schultesii,
Monorchis, Br ,, 128	Clarke iv. 105
orbiculare, $Hk.f.$,, 130	Heterocarpus glaber, Wight vi. 371
pugioniforme, Lindl ,, 130	hirsutus, Wight ,, 371
reniforme, Lindl ,, 152	? obliquus, Hassk ,, 372
unalaschoense, Rohb. f ,, 130	Heterocaryum minimum,
ep., Griff ,, 165	A. DC iv. 168
Hernandia, Linn v. 188	pachypodum, A. DC ,, 163
peltata, Meissn " 188	rigidum, A. DC ,, 163
Sonora, Linn ,, 188	Szovitzianum, A. DC ,, 163
HERNANDIEE v. 117	Heterochæta, asteroides, DC. iii. 250
Herniaria, Linn iv. 712	diplostephioides, DC ,, 251
Besseri, fisch " 712	erigeroides, DC ,, 256
cinerea, DC ", 712	sp. Str. & Wint ,, 250
hirsuta, Linn , 712	Heterolepis elegans, Ehrt vii. 291
incana, Lamk ,, 712	Heteroloma, Benth ii. 168
macrocarpa, Sibth ,, 712	Heterolytron scabrum, Jungh. vii. 217
Herpestis, Gaertn. f iv. 272	Heteropanax, Seem ii. 734
amara, Benth ,, 275	fragrans, Seem ,, 734
amara, Spanoghe 278	HETEROPETALE i. 380
connata, Spreng 269	Heterophragma, DC iv. 380
floribunda, Br ,, 273	adenophyllum, Seem 381
Hamiltonians, Benth ,, 272	chenoloides, Dalz. & Gibs. ,, 382
javanica, Bl ,, 263	Roxburghii, DC ", 381
lanceolata, Wight 273	suaveolens, Dalz. & Gibs ,, 383
lanuginosa, Bl ,, 263	aulenama V
linearis, Spreng ,, 273	Heteropogon, Hack vii. 199
Monnieria, H. B. K ,, 272	Heteropogon, Pers vii.
ovata Renth " oce	government of the second
molucomoides Donth 650	411:: D e G 100
pulcherrima, Griff ,, 267	
pygmæa, Griff iv. 267, 268	
munosa Roth aga	fernera Propi
ematherlate D1	1 1 70
en Chief	himmeters Dooms 100
Herpetospermum, Wall ii. 613	Lintus Dans 100
	1 1 1 1 1 1 100
Herpysma, Lindl vi. 98, 179	hispidissimus, Steud ,, 199 Hochstetteri Anderss 167
	Habanashani Hashas 100
Hersilia ramosa, Klotz iii. 251	Hohenackeri, Hochst ,, 199
eimples Plats 071	insignis, Thw , 200
Hesperethusa acidissima, 251	melanocarpus, Benth ,, 200 messanensis, Guss ,, 199
Room : FOT	
Roem i. 507	polystachyon, Arn vii. 201, 202
ambigua, Roem ,, 507 crenulata, Roem ,, 507	polystachyus, Nees vii. 199
Hesperis genis Forelt , 507	polystictus, Hochst ,, 200
Hesperis acris, Forsk i. 157	Rozburghii, Arn ,, 200
Heteria, Bl vi. 114, 179	Roylei, Nees ,, 200
(vide Ætheria and Etæ-	scrobiculatus, Fourn ,, 200
ria) vi. 116	Heteropywis, Griff i. 352
anomala, Lindl ,, 116	HETEROSCIADIÆ ii. 665
elata, Hk. f , 116	Heterosmilax, Kunth vi. 314
elongata, Lindl vi. 116, 197	indica, A. DC ,, 814
Gardneri, Benth vi. 115	Heterostalis diversifolia,
Helferi, Hk. f ,, 115	Schott vi. 510

Heterostalis		Vol.	Paga	Hibiscus	V o	. Page
foliolosa, Schott		VI.	510	crotonifolius, Wall	i	l. Page 332
Huegeliana, Schott		"	510	17. 17. 17. 1	٠	338
Heterostemma, W. &	A	iv.	47 47	dissectus, Wall	,	334
alatum, Wight		,,	47	diversifolius, Jacq	,	220
		,,	48	eriocarpus, DC	,	
		,,	47	esculentus, Linn	,	
tanjorense, W. S. A.	•	,,	47		,	
	•••	,,	48		,	
	•••	"	49	ficulneus, Cav	,	
Wallichii, Wight		,,	47	flavescens, Cav	,	
Wallichii, Dalz. & G		"	48	floccosus, Mast	,	
sp., Hk. f. & T.	i⊽		7, 48	fragrans, Roxb	··· ,	
Heuffelia australis, For			276	furcatus, Roxb	,	
	•••	"	276 276	furcatus, Wall	,	045
		,"	216	gangeticus, Roxb	••• ,	330
3 . 3 . 777. 7 .	••• •••	iv.	216	Gibsoni, Stocks heptaphyllus, Dalz. & Gi	, he	995
	••• •••	"	205	hirtus, Linn	•	995
Hexacentris acuminata	Nees	iv	393		,	949
			393	hirtus, Ham hispidissimus, Griff.	,	225
	· · · · · · · · · · · · · · · · · · ·	"	393	hostilis, Wall		249
****		"	393	intermedius, A. Rich.		996
"		240.	283	laguneoides, Edgew.	,	940
'			862	Lampas, Cav	, ,	945
** 1 10 700		ii.	64	liliiflorus, Griff	,	914
114 11 (3)		.,	93	Lindleii, Wall		, 335
		"	65	longifolius, Roxb	,	2.12
1 . 1 . 10		"	65	lunariifolius, Willd.	,	999
leiocarpa, DC		,,	65	macrophyllus, Roxb.	,	997
Heynea, Roxb		i.	56 5	Manihot, Linn	,	, 341
		,,	565	micranthus, Linn	,	, 335
connaroides, Wight		,,	565	mutabilis, Linn	,	, 344
quinquejuga, Roxb.	··· `···	"	565	obtusifolius, Willd	,	, 338
	•••	"	565	odoratus, Roxb	•••	, 331
		"	564	ovalifolius, Vahl	•••	, 336
17	•••	ņ	565	panduræformis, Burm.		, 338
	• • • • • • • • • • • • • • • • • • • •	i.	318	pentaphyllus, F. Muell.		, 340
	•••	Ĩ.	334	pentaphyllus, Roxb		, 341
Abelmoschus, Linn.		,,	342	phæniceus, Willd		, 335
	•••	"	338	populneoides, Roxb.		, 345 . 345
	••• •••	"	3 3 5 344	populneus, Linn procerus, Wall		ั จงก
, , , , , , , , , , , , , , , , , , , ,	•••	"	338	procerus, wan		910
-71 117-11		"	336	pruriens, Roxb		228
	••• •••	,,	341	pterospermoides, Wight		229
4		"	344	pumilus, Roxb		່ ນາຂ
asperatus, Wall.		"	338	punctatus, Dalz		, 340
bifurcatus, Roxb.		"	385	pungens, Roxb		″ 941
borbonicus, Wight		"	337	racemosus, Lindl		, 338
canaranus, Miq.		"	341	radiatus, Willd		, 335
cancellatus, Roxb.		"	342	rhombifolius, Cav		, 344
	•••	"	337	ricinifolius, Wall		, 342
cannabinus, Linn.		"	339	rigidus, Linn. f		, 335
-1. / XX7 - 11	•••	,,	342	Rosa-malabarica, Ker		, 335
clandestinus, Cav.		,,	335	Rosa-sinensis, Linn.		, 344
		"	338	rugosus, Mast		, 342
coriaceus, Heyne		,,	3 32	Sabdariffa, Linn		, 340

Hibiscus		Vol	. Page	Hierochloa	Val	Page
sagittifolius, Kurz		i.	342	Hookeri, Clarke		223
? sangujneus, Griff			340	lehaciana Olauka		223
scaber, Wall			339	2 latifolia Kunth	"	332
scandens, Roxb			337	71	"	222
scandens, Dalz. & Gibs.	٠.	"	336	77' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '		120
noindiana Claster			336		iii.	
septemnervosus, Wight	•••	"	337	microcarpa, Bl	"	120
commettee W-11	•••		338	Hildegardia populifolia, Br.		361
natara Dank	•••	**	337	Hingtsha repens, Roxb		304
0 of 0 out. 317 - 17	•••	"	338	Hinterhubera (lapsu Hinter-	:::	210
aiJaiJ., 187 0 A	•••	"	338	pubera) Kotschyi, Schultz		
of males Dank	•••	"	338	Hippia bicolor, Sm.		
nimustus Co-	•••	"	340	Hippion aquaticum, Schmidt		
Onlandon Titro	•••	"	336	hyssopifolium, Spreng	**	101
XTP 11	•••	"	342	longepedunculatum,		100
otwiatara Dank	•••	"	340	Schmidt	"	109
suborbiculatus, Wall.	•••	"	336	orientale, Dalz. & Gibs	"	101
muna than air Ti	•••	"	334	verticillatum, Spreng	?"	101
T / .	•••	"		Hippocratea, Linn	1.	623
	•••	"	344	angulata, Griff	,,	611
tetralocularis, Roxb. tetraphyllus, Roxb	•••	"	345	arborea, Roxb	**	625
tilio como Tima	•••	"	341	Arnottiana, Wight	"	624
tiliaceus, Linn	•••	"	343	barbata, F. Muell	**	623
tortuosus, Roxb.	•••	"	343	Cumingii, Laws	,,	624
tricuspis, Banks Trionum, Linn	•••	"	344	disperma, Vahl	"	625
fuern and to Day 1	•••	"	334	? disperma, Wall	"	625
tarbarlassan Clam	•••	"	338	euonymoides, Vahl	91	625
tubulosus, Cav	•••	"	338	Grahami, Wight	"	624
velutinus, DC venustus, Bl	•••	"	338	? grandiflora, Wall	"	624
maniam minia On -	•••	"	314	indica, Willd	"	624
mostitus Cais	•••	"	334 337	lanceolata, Wall	,,	624
mantatara Wall	•••	"		Lobbii, Laws	"	624
witifoling Line	•••	"	341 338	Maingayi, Laws	"	625
Wantainna 187-11	•••	"	3×9	obtusifolia, Roxb	"	623
zeylanicus, Linn	•••	**	331	obtusifolia, Roxb obtusifolia, Wight	"	625
Wiozonium I iuu	•••	iii.	399		"	625 624
blattarioides, Linn	•••		394	rigida, Hamp tortuosa, Wall	"	
corymbosum, Pers	•••	"	400	malubilia Hamma	"	624 624
crocatom, Fries	•••	"	400	II anno an anno	;"	607
dichotomum, Roxb	•••	"	415	••	i. V.	244
heteranthum, Wall		"	410	Ulmmanhan Time	v.	202
hispidum, D. Don	•••	"	410			203
lanceolatum, Royle _		"	400	uhammaidan Timu	,,	203
lanceolatum, Vill	•••	"	401	salicifolia, D. Don	,,	203
Lessertianum, Wall.	•••	"	409	tibetana, Schlecht	"	203
murorum, Clarke		"	399	Hippuris, Linn	iï.	432
prenanthoides, Villars	•••	"	400	vulgaris, Linn		432
sihiricum, Gmel	•••	"	894	Hiptage, Gærtn	i.	418
silhetense, DC		"	397	acuminata, Wall		419
sylvaticum, Lamk		"	899	candicans, Hk. f	"	419
umbellatum, Linn	•••	"	400	Madablota, Gærtn		418
virosum, Pall	•••	"	400	parviflora, Wight	"	419
vulgatum, Koch	•••	"	399	parvifolia, W. & A	"	419
Hierochloa, Gmel	•••	vii.	222	serices, Hk. f i. 419	, iv.	-
Clarkei, Hk . f	•••	,,	223	sp., Wall i. 419		
flexuosa, Hk. f	•••	,,	222	Hirea concava, Wall	i.	420
gracillima, $Hk.f.$		"	223	cordata, Heyne	,,	421
				~		

Hiræa Vol. Page	Holous	Vol. Page
Finlaysoniana, Wall. i. 422, ii. 462,	pertusus, Linn	Vol. Page vii. 173
470		,, 185
glabriuscula, Wall i. 420	racemosus, Forsk	,, 82
hirsuta, Wall, 421	Sorghum, Linn	" 18 3
indica, Roxb " 420	spicatus, Linn	,, 82
indica, Wall ,, 421	? Viranae, Ham	,, 186
7	sp., Griff	198
merguensis, Wight ,, 421	Holigarna, Ham	ii. 36
nutana Dorb 491	albicans, Hk. f	" 38
matana Wall 191	Arnottiana, Hk. f	" 3 6
antiquitate Dank 401	Beddomei, Hk. f	" 38
0 may 2 ha 22 m W o 11 490 1	ferruginea, March	" 37
Hisutsua cantoniensis, DC. iii. 249	O-1-1-11 m. t	" 97
Hitchenia, Wall vi. 224	Grahamii, Kurz	″ 90
0	TT 10 ' TIL C	" 97
conline Dulou 994	longifolia, $Roxb$	" 97
glaman Wall 994	7	" 98
mnesses Raker 995	racemosa, Roxb	" 36
December Donal " 010		iv. 596
		506
Washesternia DO 111 007	rubra, Pers	., 596
Hochstetteria, DC iii. 387	sanguinea, Retz	iii. 552
Schimperi, DC , 388	Holochilus micranthus, Dalz.	
Hodgsonia, Hk. f. & T ii. 606	Hologamium nervosum, Nees	
heteroclita, Hk. f. & T , 606	Holopeira auriculata, Miers	i. 101 101
Holarrhena, Br iii. 644	australis, Miers	101
antidysenterica, Wall ,, 644	fusiformis, Miers	"
Codaga, G. Don ,, 644	læviuscula, Miers	, 101
malaccensis, Wight ,, 644	laurifolia, Miers	,, 101
mitis, Br , 645	villosa, Miers	, 101
pubescens, Wall ,, 644	HOLOPETALE	i. 380
? villosa, Ait ,, 645	Holopteles, Planch	v. 481
Holboellia, Wall i. 108	integrifolia, Planch	,, 481
acuminata, Lindl ,, 108	Holoschænus australis, Rohb.	vi. 655
angustifolia, Wall ,, 108	filiformis, Rebb	,, 655
latifolia, Wall ,, 108	incurvatus, Dietr	" 6 56
Holbællia ornithocephala,	subarticulatus, Dietr	,, 656
Wall vii. 98	vulgaris, Link	,, 655
Holcus, Linn vii. 274	Holosetum philippinense,	
? bicolor, Linn ,, 184		vii. 64
Carar, Ham ,, 190	Holostemma, $Br. \dots \dots \dots$	i v. 21
Catamucha, Ham ,, 182	Adakodien, R. & S	" 21
cernuus, Ard ,, 184	Brunonianum, Royle	" 21
ciliatus, Roxb ,, 71	Candolleanum, Spreng	" 21
cærulescens, Gaud ,, 179	fragrans, Wall	" 21
decolorans, Willd ,, 182	læve, Bl	" 23
fulvus, Br ,, 185	læve, Bl Rheedei, Wall	" 21
Gryllus, Br " 188	Rheedianum, Spreng	" 21
halepensis, Linn " 182	Holosteum, Linn	i. 226
lanatus, Linn ,, 274	umbellatum, Linn	,, 227
latifolius, Osbeck ,, 332	Homosatherum chinense, Nees	
mollis, Linn ,, 274	•	170
montanus, Ham ,, 176	Homalanthus, A. Juss	v. 46E
natans, Roxb , 62	populifolius, Grah	,, 469
nervosus, Roxb vii. 70, 73	Homalium, Jacq	ii. 595
pallidus, Br vii. 188	foetidum, Benth	,, 597
maniaifammia Dank	fætidum, Kurz	,, 598
	grandiflorum, Benth	" 5y8
parvinorus, Br ,, 179	0	,,

Homalium	V ol.	Page	Hopea Vol. Page
Griffithianum, Kurz	ii.	597	discolor, Thw i. 310
longifolium, Benth	,,	596	eglandulosa, Roxb i. 308, v. 342
longifolium, Benth	"	597	faginea, Hort. Calc i. 308
minutiflorum, Kurz	"	596	faginea, Wall ,, 301
nepalense, Benth	"	596	floribunda, Wall ,, 304
propinquum, Clarke	"	597	000 TV & 4 900
Šohlichii, Kurz	"	597	grandiflora, Wall ,, 301
tomentosum, Benth	• • •	596	anationima Wall "907
travancoricum, Bedd	"	599	l Cuiffithii Kama 910
zeylanioum, Benth	"	596	inomado Thus " 910
Homalocenchrus oryzoides,	"	000	Inneifolia Dum 900
	vii.	94	micronthe III f
TT 1 0 0 1 11	vi.	531	oblopgifolia Duan " 900
1.4.1.		533	adamés Bank " non
	"	532	adamata Wall 908
	,,	533	One " Stad on Pierra
	"	532	l namiflana Badd 900
cordata, Schott	"	536	
deltoides, Hk. f	"		racophica, Dyer ,, 310
elliptica, Hk. f	"	536	Scaphula, Roxb ,, 301
Gaudichaudii, Schott	"	532	suava, Wall ,, 304
Griffithii, Hk. f	"	534	suavis, Kurz ,, 304
bumilis, <i>Hk. f.</i>	"	533	vasta, Wall ,, 308
Kingii, $Hk. f. \dots \dots \dots$	"	535	Wightiana, Wall ,, 809
lancifolia, Hk. f	"	533	Wightiana, Miq " 308
majus, Griff	,,	533	Hoppea, Willd iv. 100
minus, Griff	,,	538	dichotoma, Willd ,, 100
majus, Griff minus, Griff nutans, Hk. f	,,	535	dichotoma, Willd ,, 100 dichotoma, Vahl ,, 100
obliquata, Hk, f	"	534	fastigiata, Clarke ,, 100
ovata, Hk. f	"	536	HORDEZ vii. 9, 364
paludosa, Hk. f	**	531	Hordeum, Linn vii. 371
pontederæfolia, Griff	"	533	Aegiceras, Royle , 371
P propingua, Schott	"	531	brevitubulatum, Link ,, 372
pumila, <i>Hk. f.</i>	,,	53 5	cæleste, Koern. & Wern ,, 372
purpurescens, Hook	"	585	coeleste, Viborg , 371
rostrata, Griff	"	532	Decaisneanum, Hort ,, 372
rubescens, Kunth		532	distinhon Linn 971
rubra, Hassk	"	532	distinhum Kunth 979
sagittæfolia, Jungh	77	581	aumandiatiohum Watt 979
A 1 17 111 A	"	534	heteroofeshoum Donne 971
	"	537	Lametrahan Timm 071
	"	536	9 Line January Diskin 0/70
trapezifolia, Hk. f	"	585	141 - 1
truncata, Hk. f	"	534	7
velutina, Scort	"	533	menitinum Poth 979
Wallichii, Schott	??	526	
Homocentria vagans, Naud	11.		
Homonoia, Lour	▼.	455	nepalense, Sweet ,, 371
retusa, Muell	"	456	nodosum, Linn ,, 372
riparia, Lour	**	455	nudum, Ard ,, 872
symphilliæfolia, Kurz	".	456	pratense, Huds ,, 372
	٧ıĭ.	141	sativum, Pers ,, 371
Homostyles tenerrima, Wall.	ĺ٧.	44	secalinum, Schreb ,, 372
Homostylium cabulicum, Nees	iii.	257	spontaneum, C. Koch , 872
Hopea, Linn	iii.		
racemosa, Dalz. & Gibs	"	582	trifurcatum, Fisch. & Mey. " 371
spicata, Dalz. & Gibs	21	573	vaginatum, C. Koch ,, 372
Hopes, Rosb	i.	308	vulgare, Linn ,, 371
decandra, Buch	,,	308	Hornemannia bicolor, Willd. iv. 259

orata, Link & Otto iv. 279 nicobartea, Br. iv. 62 pinnata, Benth. 288 prostrata, Jack 281 Morastedtia, Retz. 236 obcordata, Hk. f. 56 obcordata, Hk. f.	Hornemannia	Vol.	Page	Но ув	v	ol. Page
prinata, Benth. 288 Nummularia, Dene. 55 prostrata, Jack 228 Leonurus, Retz. 236 cobordata, Hk. f. 57 cordata, Thunb. 16 coulifolia, Wight 115 production and the production and	orata, Link & Otto	iv.	279	nicobarica, Br		
Prostrata, Jack	pinnata, Benth	• ,,	288			K5
Horasteditia, Retz. vi. 236 Leonurus, Retz. 236 Scyphus, Retz. 236 Scyphus, Retz. 236 Scyphus, Retz. 237 Horgicidia odorata, Willd v. 106 Orbiculta, Wight 0.106 Orbiculta, Wight 0.116 Ovalifolia, Wall. 0.55 Pallida, Lindl. 0.57 Ovalifolia, Wight 0.58 Pallida, Lindl. 0.57 Parasitica, Wall. 0.57 Parasitica, Wight	prostrata, Jack	,,	281			KR
Leonurus, Retz. 236 Seyphus, Retz. 237 Horgieldia odorata, Willd. v. 106 Orbiculata, Wall. 61 Orbiculata, Wall. 65 Orbiculata, Wall		vi.	23€	oblanceolata, Hk. f		K7
Scyphus, Retz.	Leonurus, Retz	,,	236			E R
Horstonia, Wight	Scyphus, Retz		237	1		60
Hortonia, Wight			106			61
floribunda, Wight "115 pallida, Dalz. & Gibs. "59 pollifolia, Wight "115 flosackia indica, Grab. "115 floribunda indica, Linn. "57 parasitica, Wall. "57 parviflora, Wight "56 sessifora, Vahl "1434, iv. 270 pendula, Wight "56 pendula, Wight "56 pendula, Wight "57 perviflora, Wight "58 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "58 pendula, W. & A. " 59, 62 planytora, Wall. "58 pendula, W. & A. " 59, 62 planytora, Wall. "59 pendula, Wight "59, 61 pendula, Wight "59, 62 planytora, Wall. "59 planytora, Wall. "57 planytora, Wall. "57 pervoluta, Wight "59, 62 planytora, Wall. "57 pervoluta, Wight "59, 62 planytora, Wall. "59 planytora, Wall.	77 . 147 74		115	ovalifolia. W. & A		60
floribunda, Wight "115 pallida, Dalz. & Gibs. "59 pollifolia, Wight "115 flosackia indica, Grab. "115 floribunda indica, Linn. "57 parasitica, Wall. "57 parviflora, Wight "56 sessifora, Vahl "1434, iv. 270 pendula, Wight "56 pendula, Wight "56 pendula, Wight "57 perviflora, Wight "58 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "57 pendula, W. & A. " 59, 62 planytora, Wall. "58 pendula, W. & A. " 59, 62 planytora, Wall. "58 pendula, W. & A. " 59, 62 planytora, Wall. "59 pendula, Wight "59, 61 pendula, Wight "59, 62 planytora, Wall. "59 planytora, Wall. "57 planytora, Wall. "57 pervoluta, Wight "59, 62 planytora, Wall. "57 pervoluta, Wight "59, 62 planytora, Wall. "59 planytora, Wall.			115	ovalifolia, Wall		55
valifolia, Wight	floribunda, Wight		115			50
Hostackia indica, Linn iv 271	ovalifolia. Wight		115	mallida Tindl		57
## Serrata, Willd.	Hosackia indica, Grab		63			57
serrata, Wild.		iv.	271			54
Sessifora, Vahl			659			58
Houttuynia, Thunb.				3 _ 1 _ 777 . 1 4		A1
cordata, Thunb				pendula, W. & A		"59, 62
Hovenia, Thunb.			78			
acerba, Lindl.		•	640			K4
dulcis, Thunb , 640 inaqualis, DC , 640 Hoys, Br iv 52 acuminata, Benth , 53 Arnottiana, Wight , 60 Brunoniana, Wight , 61 Brunoniana, Wight , 61 canpanulata, Bl , 62 carnosa, Br , 62 caudata, Hk. f , 60 cinnamomifolia, Hook , 57 velutina, Wight , 61 coriacea, Lindl , 52 coronaria, Bl iv 58, 62 coronaria, Bl iv 58, 62 diversifolia, Bl , 61 Edeni, King , 58 Finlaysonii, Wight , 62 Griffithia, Ho , 63 Griffithii, Hk. f , 60 Griffithiana, Done , 53 Griffithii, Hk. f , 60 Griffithiana, Done , 53 coriacea, Bl , 61 diversifolia, Lindl , 58 Griffithiana, Done , 53 coriffithiana, Done , 53 coriffithiana, Done , 53 coriffithiana, Might , 59 coriffithiana, Might , 59 coriffithiana, Might , 59 coriffithiana, Might , 59 coriffithiana, Done , 53 coriffithia, G. Don , 57 coriffithiana, Might , 59 coriffithiana, Might , 54 coriffithiana,						. 57
inæqualis, DC. , 640 Hoya, Br				1		" 56
Hoya, Br.						" 55
Serpens				D		" 69
Arnottiana, Wight						" KK
bella, Hook.			_			" 57
Brunoniana, Wight						" KO
Campanulata, Bl.				1		" 54
carnosa, Br						″ ह♀
caudata, Hk. f , 60 cinnamomifulia, Hook. , 57 coriacea, Bl , 61 coriacea, Lindl , 52 coronaria, Bl iv 58, 62 coronaria, Bl iv 58, 62 coronaria, Bl iv 58, 62 diversifolia, Haw. iv 62 diversifolia, Bl , 61 Edeni, King , 53 elliptica, Hk. f , 58 Finlaysonii, Wight , 62 fusca, Wall , 58 globulosa, Hk. f , 60 Griffithiana, Dene , 53 Griffithii, Hk. f , 59 gymnanthera, Wight , 59 lanceolata, Wall , 55 lanceolata, Wall , 55 lanceolata, Wall , 54 lantifolia, G. Don , 57 latifolia, Wall , 62 linearis, Wall , 63 lobbii, Hk. f , 54 longifolia, Wall , 55 macrophylla, Wight , 56 macrophylla, Wight , 57 Maingayi, Hk. f , 62 miorantha, Hk. f , 62 miorantha, Hk. f , 62 miorantha, Hk. f , 62 provincidis, Hk. f , 46 verticillata, G. Don , 62 wiridifora, Br , 46 wiridifora, Br , 46 Wightia, Hk. f , 59 Wallichiana, Dene , 62 Wightiana, Thw , 55 Wightia, Hk. f , 59 Wightia, Hk. f , 59 Wightia, Hk. f , 59 Wightiana, Thw , 54 Hugonia, Linn , 413 hugonia, Linn , 413 dovotata, Ham , 413 Hugonia, Wall , 54 Humboldtia, Vahl , 54 laurifolia, Vahl , 274 laurifolia, Vahl , 274 laurifolia, Wall , 53 humulus, Linn , 486 Lupulus, Linn , 486 Lupulus, Linn , 487 Hunteria, Rozb	·					" 61
cinnamomifolia, Hook						17
coriacea, Bl				7		" 58
coriacea, Lindl.						" 29
coronaria, Bl. iv 58, 62 crassifolia, Haw. iv 62 diversifolia, Bl. , 61 Edeni, King , 53 elliptica, Hk. f. , 58 Finlaysonii, Wight , 62 fusca, Wall. , 58 globulosa, Hk. f. , 60 Griffithiana, Dene. , 53 Griffithii, Hk. f. , 59 gymnanthera, Wight , 62 Hookeriana, Wight , 57 imperialis, Lindl. , 59 lacunosa, Bl. , 55 lanceolata, Wall. , 56 lanceolata, Wall. , 56 lanceolata, Wall. , 56 lanceolata, Wall. , 56 longifolia, Wall. , 56 longifolia, Wall. , 56 longifolia, Wall. , 56 longifolia, Wall. , 56 macrophylla, Wight , 57 Maingayi, Hk. f. , 62 miorantha, Hk. f. , 62 miorantha, Hk. f. , 65 p. Wallichiana, Dene. , 62 Wightiana, Thw. , 56 Wightia, Hk. f. , 54 Wightiana, Thw. , 54 Wightiana, Thw. , 56 Wightiana, Thw. , 56 Wightiana, Thw. , 56 Wightiana, Thw. , 59 Wightiana, The. , 59 Wightiana, Thw. , 59 Wightiana, Th			-			" AB
Crassifolia, Haw. iv 62 Wightiana, Thw.						63
diversifolia, Bl. , 61 Edeni, King , 53 Edeni, King , 53 elliptica, Hk. f. , 58 Finlaysonii, Wight , 62 fusca, Wall. , 58 Griffithiana, Done , 53 Griffithii, Hk. f. , 59 gymnanthera, Wight , 62 Hookeriana, Wight , 57 lacunosa, Bl. , 55 lacunosa, Bl. , 55 latifolia, G Don , 57 latifolia, Wall. , 62 linearis, Wall. , 62 linearis, Wall. , 63 Lobbii, Hk. f. , 64 longifolia, Wall. , 65 macrophylla, Wight , 56 macrophylla, Wight , 57 maingayi, Hk. f. , 62 miorantba, Hk. f. , 65 meet Sap., Hk. f. to 54, 59, 60, 61 sp., Wall. iv. 54 lugonis, Linn 413 douonis, Linn						" =4
## Bdeni, King						
elliptica, \$\bar{H}k\$ f. \$, \$ 68 \				wighth, Ak. J		
Finlaysonii, Wight						
fusca, Wall. globulosa, Hk. f 60 Griffithiana, Done 53 Griffithii, Hk. f 59 Hugonier			_	Ungonia Tina		
globulosa, Hk. f. 60 Mystax, Linn. 413 67 67 67 67 67 67 67 6		"				
Griffithiana, Dene.		"		M-4- Time		**
Griffithii, Hk. f, 59 gymnanthera, Wight , 62 Hookeriana, Wight , 57 imperialis, Lindl. , 59 Lacuna, Ham. , 47 lanceolata, Vall. , 54 latifolia, G. Don , 57 latifolia, Wall. , 62 linearis, Wall. , 62 longifolia, Wall. , 54 longifolia, Wall. , 55 macrophylla, Wight , 57 maingayi, Hk. f. , 62 miorantha, Hk. f. , 65 Hugonira		"		1 TT		
Symmanthera, Wight G2 Hullettia, King V. 547 Hookeriana, Wight For imperialis, Lindl. For imperialis, Lin	T		-			"
Hockeriana, Wight						
imperialis, Lindl. , 59 Griffithiana, King , 547 Lacuna, Ham. , 47 lacunosa, Bl. , 55 lanceolata, Wall. , 54 latifolia, G. Don , 57 latifolia, Wall. , 62 linearis, Wall. , 53 Lobbii, Hk. f. , 54 longifolia, Wall. , 56 macrophylla, Wight , 57 Maingayi, Hk. f. , 62 miorantba, Hk. f. , 55 miorantba, Hk. f. , 65 miorantba, Vall. , 7274 mineuris,	gymnantnera, wight	"				
Lacuna, Ham. "47 lacunosa, Bl. "55 lanceolata, Wall. "54 latifolia, G. Don "57 latifolia, Wall. "62 linearis, Wall. "53 Lobbii, Hk. f. "54 longifolia, Wall. "53 macrophylla, Wight "54 macrophylla, Wight "55 Maingayi, Hk. f. "62 miorantha, Hk. f. "62 prioricals, Wall. "62	Hookeriana, Wight	"		dunoes, Aing		
lacunosa, Bl.	imperialis, Linai	20	7.	Urimtolana, Aing		?? <u></u>
lanceolate, Wall , 54 laurifolia, Vahl , 273 latifolia, G. Don , 57 unijuga, Bedd , 274 linearis, Wall , 62 Vahliana, Wight , 274 Lobbii, Hk. f , 54 lumulus, Linn v. 486 longifolia, Wall , 56 Lupulus, Linn , 487 macrophylla, Wight , 57 Maingayi, Hk. f. , 62 miorantba, Hk. f , 55 roriacea, Wall , 635		"		numbolatia, vant		
latifolia, G. Don ", 57 latifolia, Wall ", 62 linearis, Wall ", 53 Lobbii, Hk. f. ", 54 longifolia, Wall ", 56 macrophylla, Wight ", 57 Maingayi, Hk. f. ", 62 miorantha, Hk. f. ", 62 p. coriacea, Wall ", 62 p. coriacea, Wall ", 62	1 1 . 10 11	"				
Latifolia, Wall , 62 Vahliana, Wight , 274 linearis, Wall , 63 Humea elata, Roxb 381 Lobbii, Hk. f , 54 Lupulus, Linn v. 486 longifolia, Wall , 55 Lupulus, Linn , 487 macrophylla, Wight , 57 Hunteria, Roxb iii. 637 Maingayi, Hk. f , 62 Patroviridis, Wall , 626 miorantha, Hk. f , 55 Pcoriacea, Wall , 635	lanceolata, Hall	"			•••	**
Inearis, Wall , 53 Humea elata, Roxb i. 381	latifolia, G. Don	"				,,
Lobbii, Hk. f , 54 Humulus, Linn v. 486 longifolia, Wall , 56 Lupulus, Linn , 487 macrophylla, Wight , 62 miorantha, Hk. f , 55 Patroviridis, Wall , 626 miorantha, Hk. f , 55 Patroviridis, Wall , 635	tatifolia, Wall	"				
longifolia, Wall , 56 Lupulue, Linn , 487 macrophylla, Wight , 57 Hunteria, Rozb iii. 637 Maingayi, Hk. f , 62 miorantba, Hk. f , 55 Patroviridis. Wall , 626 miorantba, Hk. f , 655 Received and the control of the co	linearis, Wall	17				
macrophylla, Wight , 57 Hunteria, Roxb. iii. 637 Maingayi, Hk. f. , 62 Patroviridis. Wall. , 626 micrantha, Hk. f. , 55 P coriacea, Wall. , 635		"			••• '	
Maingayi, Hk. f , 62 Patroviridis. Wall , 626 miorantha, Hk. f , 55 Patroviridis. Wall , 635		"				!!
miorantha, Hk. f " 55 ? coriacea, Wall " 685		"			i	
		"			•••	
multiflora, $Bl.$, 52 corymbosa, $Roxb.$, 687		,,			•••	,,
	multiflora, Bl	"	5 2	corymbosa, Roxb	•••	,, 687

Hunteria Vol. Page	Hydrocera	Val	Page
	triflora, W. & A	i.	483
P cuspidata, Wall iii. 629 sugenifolia, Wall , 653	HYDROCHARIDEÆ	₹.	658
2 faccinal and Wall 696	Hydrocharis, Linn	₹.	662
? gracilis, Wall ,, 684	asiatica, Miq		662
Planceolata, Wall ,, 687	Morsus-ranse, Linn	"	662
Rosburghiana, Wight ,, 637	Hydrocotyle, Linn	ű.	667
reulanian Cland 697	asiation, Linn		669
9 cm Wall 694	turmanica, Kurs	"	668
Hura siamensium, Koen vi. 205	conferta, Wight	"	668
Hutchinsia calycina, Desv i. 159	densiflora, DC	"	668
procumbens, Desv ,, 159	Heyneana, Wall		667
tibetica, Thoms ,, 159	hirsuta, Bl	"	667
sp., Griff ,, 139	hirta, R. Br	"	667
Hyacinthorchis variabilis, Bl. vi. 16	hispida, D. Don		667
Hyacinthus purpureus, Griff. vi. 349	javanica, Thunb	"	667
serotinus, Linn ,, 346	laxiflora, DC	"	668
Hyalisma janthina, Champ. vi. 558	lurida, Hance	"	669
Hyalostemma Roxburghiana,	nepalensis, Hook	•••	667
Wall i. 87	nitidula, A. Bich	"	668
Hydnocarpus, Gærtn i. 196	perezigua, Hance	"	668
alpina, Wight ,, 197	podantha, Molkenb	"	668
castanea, Hk. f. & T ,, 197	polycephala, W. & A	"	667
inebrians, Vahl ,, 196	puncticulata, Miq	"	668
inebrians, Wall ,, 196	ranunculoides, Bl	"	668
ootandra, Thw ,, ,197	rotundifólia, Roxb	"	668
venenata, Gærtn ,, 196	sibthorpioides, Lam	"	669
Wightiana, Bl ,, 196	strigosa, Ham	"	667
Hydnophytum, Jack iii. 194	tenella, D. Don	"	668
formioarium, Jack ,, 194	Wightiana, Wall	"	669
montanum, Bl ,, 194	zeylanica, DC	17	667
Hydranges, Linn ii. 403	Zollingeri, Molkonb	"	668
altissima, Wall. ii. 404, see errata	Hydrolea, Linn	i∀.	133
anomals, D. Don ,, 405	iavanica. Bl	,,	134
aspera, D. Don ,, 404	zeylanica, Vahl	"	133
cyanema, Nutt ,, 404	Hydrolythrum, Hk. f	íï.	571
heteromalla, D. Don ,, 405	Wallichii, Hk . f	,,	572
khasiana, Hk. f. & T ,, 405	Hydropeltis purpurea, Rich	í.	113
robusta, Hk. f. & T ,, 405	Hydrophylax, Linn. f	iii.	199
scandens, Maxim ,, 404	maritima, Linn. f	,,	199
stylosa, Hk. f. & T ,, 405	HYDROPHYLLACEE	iŸ.	133
vestita, Wall ,, 405	Hydropityon pedunculatum,		
HYDRANGE ii. 388	Seringe	i٧.	271
Hydrilla, Rich v. 659	Hydroschoenus, Moritz	vi.	597
angustifolia, Bl ,, 659	kyllingioides, Zoll. & Mor.		· 597
dentata, Casp ,, 659	Hydrotrophus echinospermus,	٠.	•
ovalifolia, Rich ,, 659	Clarke	٧.	661
verticillata, Casp ,, 659	Hygrophila, Br	i٧.	406
verticillata, Rich ii. 432	angustifolia, Br	,,	407
Wightii, Planch v. 659	assurgens, Nees	"	407
HYDRILLE v. 658	dimidiata, Nees	"	407
Hydrobryum, Endl v. 63	incana, Nees	"	408
Griffithii, Tul ,, 64	longifolia, Kurz	17	409
griseum, Tul ,, 66	obovata, Griff	"	408
lichenoides, Kurz ,, 67	obovata, Nees	"	408
olivaceum, Tul " 66	obovata, Wight	"	408
Hydrocers, Bl i. 483	phlomoides, Nees	97	408
angustifolia, Bl ,, 488	polysperms, T. Anders	"	406
• •			

Hygrophila	Vol.	. Page			
quadrivalvis, Nees	. i v	. 408			
radicans, Nees	. ,,	407	assamions, Hk. f	"	34
salicifolia, Nees		407	parasitious, Wall	"	34
Serpyllum, T. Anders		40€		. i v .	598
spinosa, T. Anders,		408	brachiata, Wall	,,	598
Stocksii, T. Anders		407	Hymenospermum dentatum,		
undulata, Nees		408	Benth		297
Hygrorhiza, Nees		94		i▼.	228
aristata, Nees		95	Hyoseyamus, Linn		244
		, 179	agrestis, Kitaibel	,,	244
lanceolata, Hk. f			angulatus, Griff	"	245
mollis, Lindl		110	betæfolius, Lamk	"	245
Hymenachne myuros, Beauv.			Datora, Forsk	"	245
myurus, Hk. f. & T		40	insanus, Stocks		245
indica, Bühse		41	muticus, Linn	"	245
interrupta, Bühse		41	niger, Linn		244
? phalaroides, Nees		41	persicus, Bühse	"	244
sp., Hk. f. & T		240	præaltus, Walp	"	244
Hymenandra, A. DC	•••		pusillus, Linn	"	245
Wallichii, A. DC		532	Hypælyptum argenteum, Vahl	γï.	667
Hymeneria, Lindl	₹.	785	ceylanicum, Nees		667
Hymenidium Brunonis, Lindl.		706	l)	14	668
? densiflorum, Lindl		706	1 7 7 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	"	667
0 1 771		706	O-16	"	603
Hymenocallis tenuiflora, Herb		286	Hyparrhenia finitima,	"	000
	. •	200		vii.	209
Hymenocalyx variabilis,	i.	341	II	i.	120
Zenk Hymenocardis, Wall		376	leptocarpum, Hk. f. & T.		120
	▼.		procumbens Line	"	
plicata, Kurz	,,	425	procumbens, Linn	"	120
punctata, Wall	"	377	Hypelytrum, see Hypoly-	:	OF F
Wallichii, Tulasne	"	377	trum	₹i.	677
Hymenochæte grossa, Nees	¥1.	660	Hyperanthera decandra,		4=
Kysoor, Nees	"	660	Willd	ii.	45
maxima, Nees	:::	660	. Moringa, Vahl	"	45
Hymenodictyon, Wall	iii.	35	Hyperice	3.	252
excelsum, Wall	"	35	Hypericinea angustata, Wall.	ij,	24
flaccidum, Wall	"	36	dentata, Wall	i.	416
Horsfieldianum, Miq	"	85	lucida, Wall	ij.	24
obovatum, Wall	"	36	macrocarpa, Wall	j.	417
obovatum, Wight	"	35	micrantha, Wall	ii.	466
thyrsiflorum, Wall	,,	35	pedunculosa, Wall	i.	416
utile, Wight	??	35	pimentifolia, Wall	ii.	466
Hymenolæna angelicoides, DC.	. 11.	703	HYPERICINEE	i.	252
Benthami, DC	"	703	Hypericum, Linn	i.	253
Brunonis, DC	"	706	acutum, Wall	"	253
Candollii, DC	,,	703	adenophorum, Wall	,,	256
dentata, DC	"	704	alternifolium, Vahl	,,	294
Govaniana, DC	"	702	arborescens, Vahl	,,	253
latifolia, Lindl	"	703	bracteatum, Wall	,,	253
Lindleyana, Klotz	"	705	breviflorum, Wall	,,	257
nana, OstSack	17	703	calycatum, Jacquem	"	256
obtusiuscula, DC	,, .	673	calycinum, Lino	,,	2 53
pimpinellifolia, OstSack.	"	703	carneum, Wall	,,	257
pumila, DC	"	704	cernuum, Rozb	"	258
rotundata, DC	"	703	chinense, Linn	"	253
stellata, Lindl	"	705	Choisianum, Wall	"	254
sp., Hk. f. & T	"	705	coccineum, Wall	"	258

Hypericum	Vol	. Pago	Hypoestes		Val	. Page
cordifolium, Chois	i.	258	1 7 2		iv.	
coriaceum, Royle	;,	254	D D.	···		-557
aladanidas (Thais		255	1 D C. O		"	557
grantum Thumb	,•	255	147 . 17	•••	"	557
filianala Lita 4 L m	"	252		••		
fortiding III. & C. M	:,		f7	••	vii.	
	"	257		٠.	vi.	
gnidiæfolium, Rich	"	253		••	٧ì.	
Govanianum, Wall	,,	253			,,	680
grandifolium, Chois	,,	2 53	compactum, ? Moritz	••	,,	682
Griffithii, Hk. f. & T	,,	253	costatum, Thw	••	,,	681
Hookerianum, W. 🌾 A	,•	254	diandrum, Dietr		,,	678
horridum, Wall	•	257	Tona		,,	678
	255	, 256	1		"	678
intermedium, Steud	i.	256	harmal a Director			682
japonicum, Thunb	,,	256	lastentian Dist		"	678
Tolomili (14.5)		256	1-416 11 D: +		••	678
I analysman 1444 (11h at a	"	254	Latifaliana IIII.	••	"	679
leggiore a bilatili a TIT 11	"	254		••	,,	
monenthampm W. f. f. ff.	"			••	"	679
monanthemum, Hk. f. & T.	٠,	256		••	1)	678
monogynum, Willd	"	253			**	678
montanum, Linn	"	256	Pandanophyllum, F. Mael	ł.	,,	680
myrtifolium, Spach	,,	$253 \cdot$		• •	17	679
mysorense, Heyne	,,	253	proliferum, Boeck	٠.	,,	679
napaulense, Chois	"	256	schænoides, Nees	٠.	,,	678
neriifolium, Wall	,,	257	Indones Dieta	٠.	,,	667
nervosum, D. Don	,,	256	Anima 17		,,	679
oblongifolium, Chois	"	253	turgidum, Clarke		"	679
oblongifolium, Hook		254	Wightianum, Boeck.	•	"	678
oblancifolium Wall	".	254	sp., Wall vi. '6		678.	680
	"	256	II			175
materilar m 111 L	"	254	Hypopithys, Scov		111,	
	,,		lanuginosa, Nutt		"	476
perforatum, Linn	"	255	Hypoporum, Nees	•	V 1.	685
petiolatum, Walt.	7,	257	annulare, Nees	٠.	"	687
petiolulatum, Hk. f. & T.	"	255	capitatum, Nees	•	"	689
prunifolium, Wall	,,	258	gracile, Nees		,,	685
pulchellum, Wall	"	257	lithospermum, Nees		,,	685
pusillum, Chois	"	256	Roxburghii, Nees		,,	686
reptans, Hk . f . f . T	"	255	HYPOXIDEÆ		٧ı.	277
rubrum, Wight	11	255	Hypoxidopsis pumila, Steud	١.	vi.	357
salicifolium, S. & Z	"	253	Hypoxis, Lian		vi.	277
Sampsoni, Hance	"	255	aurea, Lour		,,	277
setosum, Wall		256	brachystachya, Wight			279
000 4 mile annum 117 - 11	••	253			"	278
tomino -1 - 112 f 0 //	"	251	3. 1.1. Ok 3		"	279
4.4	"	254	77		"	278
unalina Una	"				"	
wralina, Ham	"	254	latifolia, Wight		7,7	279
Wightianum, Wall	.2.	256	leptostachya, Wight	•	,,	279
		120	minor, D. Don	•	,,	278
racemosum, Kurz		120	pauciflora, Wight		,,	279
strictum, Kurz		121	Saarpata, Ham		,,	278
Hypobrichia Spruceana, Benth.	ii.	568	trichocarpa, Wight			279
		400	Hypserpa cuspidata, Miers		i.	100
alahma Linu		401	paucylora, Miers		"	100
TT 1	,,	557	prævaricata, Miers			100
Desgioneana None		558	unifora, Miers		"	100
lanata Dele	•	557	Hyptianthera, W. & A	,	'n.	121
lamidana Nasa		558	PR11			122
VOL. VII	"	· ·	macrocarpa, Thw	•	19	

Hyptianthera Vol. Page	Ilex	37-1	D
rhamnoides, Morr. & Zoll. iii. 135	denticulata, Wall	voi.	Page 600
W fo A 101			599
	Pelliptica, D. Don	·;· "	603
	entarginella, Turcz	,,	600
		••• "	601
	embelioides, Hk.f	••• ,,	603
stachyodes, Link ,, 644	excelsa, Wall	••• ,,	603
suaveolens. Poit ,, 630	exsulca, Wall	••• ,,	
Huminanura hirta, Miq v. 586	fragilis, Hk. f	,,	602
javanica, Miq ,, 583	Gardneriana, Wight	,,	603
pentandra, Miq ,, 583	gaultheriæfolia, Kurz	,,	601
triandra, Miq ,, 587	Godajam, Colebr	,,	604
Walkeriana, Thw ,, 583	Griffithii, Hk. f	,,	601
Нувворце, Linn iv. 649	Horsfieldii, Miq	• • • • • • • • • • • • • • • • • • • •	602
cristatus, Lamk ,, 631	insignis, Hk . f	*** ***	599
lophanthoides, Ham. iv. 618, 624	intricata, Hk.f	••• ,,	602
ocymifolius, Lamk iv. 646	latifolia, Thunb	••• 11	599
officinalis, Linn ,, 649	macrophylla, Wall	• • • • • • • • • • • • • • • • • • • •	604
Hysteria veratrifolia, Reinw. vi. 91	Maingayi, Hk . f	,,	605
v	malabarica, Bedd	*** ;;	600
Iberidella, Boiss i. 162	niligirica, Miq	,,	600
Andersoni, Hk. f. & T ,, 163	odorata, Ham	,,	599
ICACINEE i. 573	rotunda, Thunb	,,	604
Ichnanthus, Sw vii. 60	sclerophylla, $Hk. f.$,,	606
foliolosus, Munro ,, 61	singapuriana, Wall	,,	605
pallens, Munro ,, 60	spicata, Bl	,,	598
Ichnocarpus, Br iii. 669	sulcata, Wall	,,	604
affinis, Hk. f. & T ,, 670	theæfolia, $Hk. f.$	22	601
dasycalyx, Miq ,, 669	theæfolia, Hk. f	iii.	512
fragrans, Wall ,, 667	Thomsoni, Hk. f	î.	602
frutescens, Br ,, 669	venulosa, Hk. f	,,	602
? inflata, Ham ,, 667	Walkeri, Wt. & Gard.	••• ,,	600
latifolia, Ham ,, 670	Walkerii, Turcz	,,	600
leptodictyus, Muell ,, 669	Wallichii, Hk. f	,,	605
ovatifolius, A. DC ,, 670	Wightiana, Wall	,,	603
publiflorus, Hk. f, 670	Wightiana, Dalz. & Gib	B. "	600
radicans, Wall ,, 669	? sp., Wall	,	599
Ioica dentata, DC i. 506	Ilicinea, ? Wall	į.	605
indica, W & A ,, 531	ILICINEÆ	<u>.</u> i.	598
Ifloga, Cass iii. 277		i▼.	711
cauliflora, Clarke ,, 278	Illecebrum bengalense, Lix		731 726
Fontanesii, Cass ,, 277	brachiatum, Linn	••• "	727
spicata, Schultz ,, 278	javanicum, Ait	••• ,,	728
-6	lanatum, Linn	••• ,,	729
bicornis, Becc ,, 417 brevipes, Hk. f 416	Monsonium, Linn pubescens, Willd	••• ,,	729
		"	247
	verticillatum, Burm. Illicium, Linn	•	39
	Griffithii, Hk. f. & T.		, 281
malananaia Para " 416		i.	40
mammula Dana A17	majus, Hk. f. & T	•••	. =
-1	Illigera, Bl appendiculata, Bl		460
	Coryzadenia, Meissn.	•••	460
Ilex, Linn i. 598	khasiana, Clarke	,,	461
coe l	Kurzii, Clarke	,,	460
oymosa, Bl ,, 605	obtusa, Meissp	,,	46 L
daphnephylloides, Kurs i. 606, ii.	Ilysanthes, Rafin	iv.	283
747	gratioloides, Regel	,,	281
,		•	

**************************************		_	1 Ton 4 ton-		_
Ilysanthes		Page	Impatiens	V ol. ∶	rage 444
hyssopioides, Benth	. iv.	283	Denisonii, Bedd	i.	481
minima, Benth		284	depauperata, Hk. f	*** #	471
parviflora, Benth	••	283	discolor, Wall	,,	446
rotundifolia, Benth		284	diversifolia, Wall	,,	476
Impatiens, Linn	. i.	440	Edgeworthii, Hk. f.	,,	481
acaulis, Arn	. ,,	443	elata, Edgew	••• ,,	
acuminata, Benth	. ,,	462	elegans, Bedd	*** ,,	465 466
Akka, Bedd	. ,,	443	elongata, Arn	*** 17	457
albida, Wight		458	eriantha, Turcs	***);	
	i. 4 75,		fasciculata, Lamk		444
amplexicaulis, Edgew	. 1.	469	filiformis, W. & A	i. 4 <u>1</u> 7,	
anamalayensis, Bedd	. ,,	452	fimbriata, Hook	i.	46).
angustiflora, $Hk. f. \dots$		480	flaccida, Arn	••• "	457 452
appendiculate, Arn	. 77	464	flavida, Hk. f. & T	,,	457
arcuata, Wall	• ,,	454	floribunda, Wight	••• ,,	
arguta, Hk. f. & T	• ,,	470	fruticosa, DC	••• ,,	459
Arnottiana, Miq	• 17	446	Gardneriana, Wight	•• ,,	445
Arnottii, Thw	• 11	466	Gardneriana, Wight	*** ***	450
assamensis, Griff	٠,,	483	gibbosa, Arn	••• ,,	455
auriculata, Wight	. ,,	460	gigantea, Edgew	••• ,,	469
Ballardi, Bedd	• ,,	482	glandulifera, Arn	*** ,,	454
Balsamina, Linn	٠,,	453	glandulifera, Royle	***);	468
Balsamina, Dalz	. ,,	454	glauca, Hk. f. & T	,,	482
Balsamina, Linn	. ,,	454	Goughii, Wight	••• ,,	452
Beddomei, $Hk. f.$. ,,	442	gracilis, Bedd	••• 11	413
bella, Hk. f. & T	. ,,	458	grandis, Heyne	,,	463
bicolor, Royle	٠,,	476	Griffithii, Hk. f. & T.	,··· »	445
bicornuta, Wall	. ,,	475	Hamiltoniana, D. Don	,,	472
bisida, Thunb	. ,,	457	Henslowiana, Arn	".	458
biglandulosa, Moon	. ,,	463	heterophylla, Wall	i. 441,	
bipartita, Arn	. ,,	457	hispidula, Benth	i.	470
brachycentra, Kar. & Kin	٠. ,,	481	Hoffmeisteri, Klotz	,,	471
bracteata, Coleb	. ,,	46 L	Hookeriana, Arn	••• ,,	463
brevicornu, Arn	. ,,	455	inconspicus, Benth.	,,	447
bulbosa, Moon	. ,,	443	inconspicua, Wight	,,	448
calycina, Wall	. ,,	472	insignis, DC	,,	477
oumpanulata, Wight	. ,,	463	janthina, Thw	,,	461
candida, Lindl	. ,,	469	Jerdoniæ, Wight	*** ***	460
capillipes, Hk. f. & T	. ,,	456	Jurpia, Ham	,,	471
Catheartii, Hk. f		473	Kleinii, W. & A	,,	445
chinensis, Linn		444	lævigata, Wall	,,	473
circeoides, Wall	. ,,	453	latiflora, Hk. f. & T.	,,	459
circæoides, Turcz	. ,,	452	latifolia, Linn	,,	450
clavicornu, Turoz		483	latifolia, Hook	,, .	457
coccinea, Wall		454	latifolia, Moon	,, '	457
concinna, Hk. f		449	latifolia, W. & A	,,	451
cordata, Wight		462	Lawii, Hk. f. & T	,,	448
cornigera, Arn		466	laxiflora, Edgew. i.	179, 480,	
cornigera, Hook		454	lavistora, Hk. f. & T.	i.	481
cornuta, Linn	•••	454	laviflora TWall	,,	478
orenata, Bedd		442	leptoceras, DC	,,	477
cristata, Wall		472	leptopoda, Arn	,,	455
cuspidata, W. & A		450	leptura, $Hk. f. \dots \dots$	*** ,,	46 7
cymbifera, Hk. f		474	Leschenaultii, Wall.	,,	450
Dalzellii, Hk. f. & T		449	lencantha, Thw	,,	464
dasysperma, Wight		457	ligulata, Bedd	,,	446
debilis, Turoz		483	linearis, Arn	,,	464
	. ,,	-	•		

336 _e	GENERAL	INDEX.	
[mpatiens	Vol. Page	Impatiens	Vol. Page
lineata, Turcz	i. 468	rufescens, Benth	i, 449
Lobbiana, Turcz	., 454	salicifolia, Hk. f. S.	T , 450
	476, 477		i. 150, 454
longiflora, Heyne	i. 417 ₀	scabrida, DC	i. 472
longifolia, Wight		scabriuscula, Heyne	,, 454
longipes, Hk. f. N. T	470 1	scapiflora, Heyne	
lucida, Heyne		scapiflora, Hook	, 443
macrochila, Lindl	100	scapittora, W. & A	, 442
macrophylla, Gardn	454	semiverticillata, Tur	cz, 482
maculata, Wight	,, 465	serrata, Benth	, 473
malayensis, Griff	100	setacea, Colebr	,, 414
micrantha, D. Don		setosa, Hk. f. & T	,, 455
micranthemum, Edgew	., 481	spirifer, Hk. f. N. T.	,, 471
mishmiensis, $Hk. f. \dots \dots$,, 476	stenantha, Hk. f	
modesta, Wight	,, 442	Stocksii, Hk. f. & T.	,, 442
mollis, Wall	,, 470	subcordata, Arn	
moschata, Edgew	,, 469	sulcate, Wall	. i. 469, 475
multijlora, Wall	., 470	Tangacuee, Bedd	
Munronii, Wight	,, 456	tavoyana, Benth	, 168
mysorenis, Roth	,, 456	tenella, Heyne	
mysorensis, Roth	,, 447	tenella, Rottl	
mysorensis, Wall	,. 447	tenella, Wall	
natans, Willd		tenuicula, Steud	
Noli-me-tangere	., 482	tennis, Bodd	
odorata, D. Don	., 477	Thomsoni, 11k. f	
oppositifolia, Linn	., 448	tingens, Edgew	
orchioides, Bedd	,, 443	tomentosa, Heyne	
pallens, Edgew	,, 476	tomentosa, Dalz	
paludosa, Hk. f	,, 480	travancorica, Bedd.	,, 461
parasitica, Bedd	., 460	tricornis, Lindl	
Parishii, Hk. f	,, 456	tritora, Linn	.,
parvifolia, Bedd	,, 453	trilobata, Colebr	
pendula, Heyne		tripetala, Rexb.	, 470
Perrottetii, Turoz	,, 447	tropæolifolia, Griff.	, 472
phonicea, Bedd		truncata, Thw.	, 455
picta, Kp. & West	., 476	tuberoulata. Hk. f. S	
porrecta, Wall	,, 472 ., 470	umbellata, Heyne	" 170
puberula, DC	" 150	umbrosa, Edgew	176
pulcherrima, Dalz	150	umbrosa, Hk. f uncinata, Wight	" 105
pulchra, Hk. f. & T	,, 453 ., 452		471
pulniensis, Bedd pusilla. Heyne i.		urticifolia, Wall	, 444
pusilla, Heyne i. racemosa, DC	i. 479		459
111. # R /T	476	· wielenflere III. f	457
	478, 479	viridiaora, Wight	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
racemulosa, Wall	i. 468	viscida, Wight	1400
radiata, Hk. f	,, 476	viscosa, Bedd	450 450
radicans, Benth	., 451	Walkeri, Hook	: 107
	417, 448	Wightiana, Bedd.	107
repens, Moon	i. 455	T	vii. 106
reticulata, Wall	,, 448	Allang, Jungh	108
rivalis, Wight	,, 444	arundinacea, Cyrill.	" 100
rosea, Lindl	., 454	caudata, Trin	167
	447, 448	condensata, Steud	" 100
	447, 448	cylindrica, Beauv	" 100
Roylei, Walp	i. 468	exaltata, Brongn	14.77
Roylei, Klotz	,, 476	filifolia, Nees	100

Imperata	Wal	Dao	Indigofera	Vol	Page
? jaculatoria, R. & S.	voi.	Page 107	Finlaysoniana, Wall.	ii.	100
Kominii Danaa		106	flaccida, Kosn		97
7' 6' ' ' ' ' ' '		106	plesuosa, Grah	• • • • • • • • • • • • • • • • • • • •	113
	••• ,,	107	• foliolosa, Grah		99
0'1'' () '	••• ,,	106	fragrans, Retz		95
Sisca, Beauv	,,	106	frumentacea, Roxb	,,	94
	,,	119	fusca, G. Don	,,	98
m N		106	galegoides, DC	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	100
Incarvillea arguta, Royle	iv.	385	Gerardiana, Wall	,,	100
J28 D. 1.		385	Gibsonii, Grah	••• ,,	101
Emodi, Wall		385	glabra, Linn	,,	95
-1.1	,,	359	glandulosa, Willd	•••),	94
parasitica, Roxb	,,	338	glauca, Lauk	•••),	98
Indeterminata, Wall	i. 498,		glaucescens, Grah	,,	101
627; ii. 22, 50, 106,			glutinosa, Perr	,,	95
iii. 1	32; vi	. 299	glutinosa, Roxb	,,	95
Indigastrum, deflexum, J. &		97	graveolens, Roxb	,,	95
T	ii.	92	Hamiltonii, Grab	,,	101
1 1 11 (11	,,	96	hebepetals, Benth	,,	101
	,,	94	hedysaroides, Lamk.	,,	96
i 41-4- 01411	,,	102	heterantha, Wall	ii. 100	, 102
37 63	,,	98	heterophylla, Roxb	ii.	97
	,,	97	hirsuta, Linn	,,	98
arborea, Roxb	,,	101	Hochstetteri, Baker	,,	102
arcuata, Willd	,,	96	inamæna, Thw	,,	99
A	,,	98	indica, Lamk	, ,,	99
. A . D . 1	••• ,,	97	Jirahulia, Ham	,,	101
argentea, Wall	,,	96	Kleinii, W. & A	,,	98
armata, Wall	,,	96	lateritia, Willd	,,	95
	,,	98	leptostachya, DC	,	100
aspalathifolia, Roxb.	,,	91	Leschenaultii, DC	,,	96
aspalathoides, Vahl	,,	94	lincaris, Guill. & Perr.	,,	97
asperifolia, Hochst.	,,	94	linifolia, Retz	,,	92
atropurpurea, Ham.	,,	101	marginulata, Grah.	,,	97
brachycarpa, Grah	,,	99	moluccana, DC	,	96
practeata, Grah	,,	100	mucronata, Spreng.	,,	97
Brunoniana, Grah	,,	93	multicaulis, DC	,,	96
cærulea, Roxb	,,	99	mysorensis, Rottl	,,	102
cæspitosa, Wight	,,	94	orixensis, Roxb	,,	96
caloneura, Kurz	,,	93	ornithopodioi les, Hochi	st,,	102
canescens, Grub	,,	96	parviflora, Heyne	••• ,,	97
canescens, Lamk	,,	96	pauciflora, Delile	,,	97
capitata, Grab	,,	81	pedicellata, W. Y A.	,.	95
cassioides, Rottl	,,	101	pentaphylla, Linn	••• ,,	. 95
cinerea, Willd	,,	96	peregrina, DC	••• 31	96
congesta, Grah	,,	96	polyphylla, DC	,,	100
cordifolis, Heyne	,,	93	polyphylla, Heyne	,,	102
cylindracea, Wall	,,	99	polyphylla, Rottl	,,	99
debilis, Grah	,,	98	prostrata, Roxo	*** ***	92
desmodioides, Benth.	,,	153	prostrata, Willd	*** **	96
Dosus, Ham	,,	102	pulchella, Roxb	,,	101
Dosua, Wall	,,	100	purpurascens, Roxb.	*** ***	101
echinata, Willd	,,	92	pusilla, Lamk	,,	98
elliptica, Roxb	,,	101	quadrangularis, Grah.	··· , "	100
endecaphylla, Jacq.	,,	98	retusa, Grah	••• ,,	99
enneaphylla, Linn	,,	94	rigida, Willd	••• ,,	96
ferruginea, Sch. & Th.	••• ,,	98	scabra, Roth	,,	97

Indiantore	**	-1 1	Da	l Inge	Wal.	Domo
Indigofera Schimperiana, Hochst.		оь J i.	Page 98	Inga xylocarpa, DC	ii.	Page 286
1, ² 11 11 2 1			98	Inodaphnis lanceolata, Miq.		392
		"	102	Intsia coriacea, Maingay		275
b 1-4- 17-11		"	96	palembanica, Miq		275
		,	99	Inula, Linn	iii.	291
A 10 . 11 - 10 - 441		",	95	acuminata, DC	,,	294
A Dowl		", "	96	appendiculata, Wall	"	297
Thonningii, Sch. & Th.		" "	97	aspertima, Edgew	"	293
timoriensis, Willd		"	96	auriculata, Wall	"	297
tinctoria, Linn		"	99	? brahuica, Boiss	"	292
tinctoria, Forsk		"	98	Cappa, DC	"	29 5
tomentosa, Grah		,,	102	cuspidata, Clarke	,,	296
trifoliata, Linn		"	96	cutchica, Clarke	"	296
trigonelloides, J. & S.		"	94	dysenterica, Linn	"	298
A		"	93	eriophora, DC	,,	295
Amian Town C		"	96	eupatorioides, DC	"	295
uncinata, Roxb		"	100	Falconeri, Hk . f	"	294
: A TT		"	94	gnaphaloides, Vent	33	299
		,,	101	grandiflora, Willd	"	294
vestita, Baker		,,	96	grantioides, Boiss	,,	296
riolacea, Roxb		"	101	graveolens, Desf	,,	2 92
virgata, DC		,,	96	Griffithii, Clarke	,,	296
virgata, Roxb	ii. 10	ÖO,	102	Helenium, Hk. f. & T	,,	292
viscosa, Lamk	i	i.	95	Hookeri, Clarke	,,	294
Wightii, Grah		,,	99	indica, Linn	٠,,	297
Zollingeriana, Miq			100	Kalapani, Clarke	"	29 5
Inga, Willd	i	ii,	306	? macrocephala, Kotschy	"	292
acutangula, Grah		,,	306	macrosperma, $Hk. f.$,,	292
		,,	3 03	nervosa, Wall	,,	293
attenuata, Grah		,,	305	nitida, Edgew	"	293
12 777211.3		,	303	obtusifolis, Kerner	,,	293
bubalina, Jack		,	304	Oculus-Christi, Clarke	,,	293
	,	,,	304	polycephala, Klatt	"	296
	,	,,	805	polygonata, DC	"	29 3
Clypearia, Wall		"	304	Pseudo-Cappa, DC	"	295
concordiana (corcondian	ıa)			Pulicaria, Linn	"	298
DC	•••	,,	303	quadrifida, Ham	"	299
contorta, Grab		,,	305	racemosa, Hk. f	,,	292
	,	•	306	rhisocophaloides, Clarke	"	295
	••• ,	,,	305	rhizocephala, Schrank	"	295
	•••	,,	286	Royleans, DC	"	292
	•••	,,	802	Royleana, Clarke	"	292
		,,	305	rubricaulis, Clarke	"	296
	•••	"	301	salicina, Clarke	"	294
flexuosa, Grah		"	303	salviodora, Schultz	"	295
			303	Simonsii, Clarke	"	2 93
			301	Stoliczkai, Clarke	"	292
127 2 147 . A. A	_	,,	304	Thomsoni, Clarke	"	293
Koenigii, W. & A		•	303	verrucosa, Klatt	,,	293
lignosa, Grah		"	286	vestita, Wall	991	297
	90		305	INULOIDEE iii. Involucraria Wallichii, Ser.	221,	607
	ii. 29		306		ii.	595
			803	Iodes, Bl.:	i.	596
		,.	802	? Brandisii, Kurz Hookeriana, Baill	"	596
and the same of th		••	801		"	597
TTT 1 4 4 4 1		"	303		"	596
Wightiana, Gran	••••	"		ovalis, Bl	"	200

[odes	Vol	Page	Гротеа		اما .	Page
Thomsoniana, Baill		596	calycina, Benth		iv.	208
tomentella, Miq		596	campanulata, Linn	•••	"	211
lone bicolor, Lindl		770	capitata, R. & S		"	193
candida, Lindl		770	capitellata, Chois	•••	"	204
cirrhata, Lindl		769	cariosepala, Klotz	•••	"	201
fusco-purpurea, Lindl		769	carnosa, Br	•••	,,	213
khasiana, Lindl		770	Catesbæi, Mey		"	202
paleacea, Lindl		769	chryseides, Ker	•••	"	206
virens, Lindl		770	Clarkei, Hk. f	•••	"	734
lonidium, Vent	•	185	coccinea, Linn		,,	199
enneaspermum, DC		185	cœrulea, Koen		,,	199
erectum, DC		185	cœrulescens, Roxb		"	200
heterophyllum, DC		185	compressa, Guss		"	215
hexaspermum, Dalz		185	coptica, Roth		,,	200
leptorhizum, DC		185	cuspidata, D. Don		,,	215
ramosissimum, Thw		186	cymbalaria, Fenzl		,,	206
suffruticosum. Ging	-	185	cymosa, R. & S		,,	211
Wightianum, Wall		185	cymosa, Baker	•••	"	208
Ioniris Doniana, Klatt	٠,	272	cynanchifolia, Clarke		"	208
fragrans, Klatt		272	dasysperma, Jacq		,,	215
Pallasii, Klatt		272	dentata, Willd	•••	,,	206
triflora, Klatt		272	denticulata, Chois		,,	208
Iphigenia, Kunth		357	denticulata, Br		"	205
caricina, Kunth		357	dichroa, Chois		,,	213
indica, Kunth		357	digitata, Linn		"	202
pallida, Baker		357	Dillenii, R. & S		"	199
racemosa, Kunth		357	dissecta, Willd	'	"	200
Iphisia Govanii, Wight	•	40	dissecta, Chois	•••	"	214
multiflora, W. & A		40	elliptica, Roth		,,	192
Ipomæa, Linn	• • • • • • • • • • • • • • • • • • • •	. 196	eriocarpa, Br		"	204
acetosæfolia, R. & S		213	eriosperma, Beauv		,,	202
aculeata, Bl		197	fastigiata, Sweet		,,	209
anceps, R. & S		212	fastigiata, Chois		"	187
angularis, Chois		213	filicaulis, Bl		"	205
angustifolia, Jacq		205	gangetica, Sweet		"	184
aquatica, Forsk		210	gemella, Chois		,,	207
atropurpurea, Chois		194	gemella, Roth		,,	206
atrosanguinea, Hook		191	glaberrima, Bojer	•••	,,	198
barbata, Chois		195	Glenieii,. Thw		,,	208
barbata, Roth		199	Gomezii, Clarke		"	211
barlerioides, Benth		201	gossypifolia, Willd		,,	202
Batatas, Lamk		202	grandiflora, Lamk		"	198
Beladamboe, R. & S.		209	grandistora, Roxb		"	197
	. ,,	216	hederaces, Jacq		,,	199
7 : 4 7 . 79 . 41	,,	211	hepaticifolia, Burm.		"	204
Lil-Li 77	,,	212	hepaticifolia, Linn		,,	204
? bipedunculata, Clarke		215	Heynei, R. & S		"	211
blanda (lapsu Olanda)			Heynei, Wall	•••	,,	209
G	. "	211	hirsuta, Br		"	214
Th	. ,,	197	hispida, R. & S	•••	"	204
D D1	. ,,	197	Horsfieldiana, Miq		"	204
1	. ,,	203	imbricata, Roth		"	191
1	. ,,	216	insignis, Andr	•••	"	202
Lucidordo Onelo	. ,,	189	insuavis, Bl		"	207
TO 1 11 (70) 1.	. ,,	210	involucrata, Beauv	•••	"	203
12 - 2	. ,,	211	juounda, Thw	•••	"	198
calycina, Benth		201	kentrocaulis, Clarke		"	218
	. "				••	

_			_		
Ipomæa	Vol.	l'age	Ipomæa		Page
Kleiniana, R. & S	iv.	188	repens, Roth	, i♥.	210
laciniata, Clarke	,,	200	reptans, Poir	,,	210
lanceolata, G. Don	,,	201	rhyncorhiza, Dalz.	٠٠ ,,	214
laurifolia, Sweet	,,	192	Rothii, R. & S	,,	211
liqulata, Bojer	19	204	Roxburghii, Steud	,,	197
lilacina, Bl	*** ;;	184	rubens, Chois	,,	195
linifolia, Bl	•••	205	rugosa, Chois	,,	209
littoralis, Boiss	,,	213	rumicifolia, Chois	,,	207
littoralis, Thw	,,	208	sagittata, Roxb	,,	201
longiflora, Br	,,	198	salicifolia, Roxb	,,	210
longifolia, Benth	,,	2 · 3	scabra, Chois	,,	200
luteola, Jacq	,,	199	senegalensis, Lamk	,,	214
macrantha, R & S	,,	198	sepiaria, Kæn	iv. 209	216
malabarica, R. & S	,	189	sessiliflora, Roth	· iv.	204
maritima, Br	••• ,,	212	setulosa, Zoll	,,	205
mauritiana, Jacq	,,	202	sibirica, Pers	,,	207
melanosticta, G. Don	,,	184	sidæfolia, Chois	,,	216
microphylla, Roth	iv. 216	,218	sinuata, Orteg	,,	214
multiflora, Roxb	iv.	215	speciosa, Bl	;•• ,,	185
muricata, Jacq	,,	197	sphærocephala, D. Don	,,	194
nicobarica, Kurz	,,	208	sphærocephala, Sweet	,,	204
Nil, Roth	,,	199	splendens, Sims	,,	186
noctylora, Griff	,,	197	staphylins, R. & S.	,	210
noctiluca, Herb	,,	197	stipulacea, Jacq	,	214
obscura, Ker	,,	207	stipulacea, Sweet	,,	209
obscura, Hassk	,,	207	Stocksii, Clarke	,,	204
ochrolenca, Spanog.	,,	207			734
ocularis, Bartl	,	207	striata, Roth	iv.	209
Olanda, vide blanda	,,	211	strigosa, Roth	,,	194
osyrensis, Roth	,,	192		iv. 208,	210
ovalifolia, Chois	••• ,,	216	subtriflora, Zoll	iv.	206
palmata, Forsk	,,	214	subtrilobans, Miq	11	209
paniculata, Br	··· "	202	tamnifolia, Burm	••• ,,	204
paniculata, Burn	"	220	tiliæfolia, R. & S	,,	184
parviflora, Pers	,,	220	timorensis, Bl	,,	216
peltata, Chois	,,	211	triantha, R. & S	iv. 209,	
pendula, Br	,,	214	trichosperma, Bl	iv.	198
pentadactylis, Chois.	,,	214	tridentata, Roth	,,	205
pentaphylla, Jacq		202	triquetra, R. & S	,,	212
Pes-Capra, Roth		212	Tuba, G. Don	,,	198
Pes-tigridia, Linn	,,	204	tuberculata, Ker	,,	215
petaloidea, Chois	,,	212	tuberculata, R. & S.	,,	214
phænicca, Roxb	,,	199	tuberosa, Linn	,,	214
pileata, Roxb	,,	203	tuberosa, G. Mey	,,	202
pilosa, Sweet	••• ••	213	tuberosa, A. Rich	,,	213
pilosa, Cav	,,	202	Turpethum, Br	,,	212
platensis, Ker	••• ,,	202	uniflora, R. & S	;,	201
polyantha, Miq	,,	206	vitifolia. Sweet	,,	213
poranoides, Clarke		208	Wallichii, Steud		216
pulchella, Roth	,,	214	Weinmanni, R. & S.	,,	216
punctata, Pers	,,	199	Wightii, Chois.	,,	203
purpurea, Lumk		200	vanthantha, Kurz	,,	212
Quamoclit, Linn	,,	199	77. 17	,,	198
quivata, Br		214		i v. 187,	
racemosa, Roth	,,	210	sp., Hk. f. & T. iv. 188, 2		
reniformis, Chois		206	Ipsea, Lindl v.	812. vi.	178
repens, Lawk	,,	209		▼.	812
	,,			•••	

•			'	•		
lpsea.		ol. Page	Isachne			Pege
speciosa, Lindl	1	7. 812	dispar, Wight	• • •	vii.	
P Wrayana, Ilk. f		,, 812	elatior, Hk. f	• • •	,,	22
Iresine javanica, Burm.	i	v. 727	elegans, Dalz		,,	23
persica, Burm		,, 727	firmula, Büse		,•	24
IRIDEÆ	¥	ri. 271	Gardueri, Benth		,,	26
<i>Ir</i> idorchis gigantea, Bl.	1	ri. 12	geniculata, Griff		٠,	25
Irina glabra, Bl	1	i. 691	himalaica, Hk. f		,.	23
integerrima, Bl	i	i. 7	javana, Nees		,,	21
Iris, Linu	v	i. 271	Kunthiana, W. & A.		,,	21
Aitchisoni, Boiss	,	, 272	lepidota, Stend		,,	25
aurea, Lindl		, 273	Lisboæ, Hk. J		,,	22
biglumis, Vahl		, 272	mauritiana, Kunth		"	25
Clarkei, Baker	,	, 275	meneritana, Poir		,,	25
crecea, Jacq	,	979	Metzii, Hochst		,,	21
decora, Wall		971	miliacea, Roth		,,	25
deflexa, Kn. & Weste.		075	minutula, Kunth		,,	25
Doming Sauch		979	monticola, Büse			24
Darkhard M. Ward	••• ,	375	multiflora, Trim		**	22
, (n) 1		.,,	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		**	23
e 7 · 11	···• ,	17.3			•,	26
			muricata, Nees	• • • •	"	24
	,	71	Myosotis, Benth	•••	"	21
goniocarpa, Baker	,	.,,	Necsiana, Arn	•••	,,	26
	,		nilagirica, Hochst	• • • •	"	26
	,		nilagirica, Trim	• • • •	••	271
	••• ,,		perpusilla, W. & A	•••	"	
	••• ,,		polygonoides, Doell	•••	"	25
	••• ,,		pulchella, Roth	•*	"	246
	,,		rigida, Necs	• •	"	24
	,		scabrosa, Hk. f	•••	,,	23
	,,	273	stigmatosa, Griff	•••	,,	25
	,	272	tricarinata, Roth	• • •	,,	44
nepalensis, $D.\ Don \dots$,,	273	ventricosa, Doell		"	59
	.∴ ,,	276	virgata, Nees	• • •	,,	23
	vi. 27	5, 276	Walkeri, W. & A		,,	26
7744 N. T. T. T. T.	VI	. 272	sp., Wall vii. 22, 2	3, 2	5, 47	, 51
pobulina, Naud	,,	272	Isanthera, Nees		iv.	372
Dallanii Diaal	,,		floribunda, Gardn		,,	372
and the social A it	,,	070	permollis, Necs		٠,	372
Olomain abitana 1 imm	,,	97.2	ISATIDEÆ		1.	130
annumin Timu	,,	272	Isatis, Linn		i.	163
Stocksii, Boiss	,,	272	costata, C. A. Mey		,,	163
nulanta W-11	,,	274	spartioides, Edgew		,,	164
Manina I. ac.		274	tinotoria, Linn		,,	163
4	··· ,,	272	Isauxis cordifolia, Thw.		i.	30 3
137 AA:: 12 . 7	• • • • • • • • • • • • • • • • • • • •	273	Rosburghiana, Thw.		11	·303
Vinkin, Time		272	Ischæmum, Linn		V11.	126
Tamin air III. F	i.	522	abbreviatum, Ham		,,	31
and Indiana - All Indiana		522	angustifolium, Hack.		"	129
Tanakan Da			aristatum, Linn.			126
		25	aristatum, Burm		,,	127
-1b m	,,	22			"	133
A	,,	25	1 1	•••	"	127
	•• ,,	25 24		•••	"	133
	•• ,,		barbatum, Ham	•••	"	127
	. ,,	23	barbatum, Retz	• • • •	"	127
	,,	271	barbatum, Rottl	•••	"	133
diamon Tain	,,	24	ciliare, Retz	•••	"	140
dispar, Trin	•• ,,	26 i	ciliare, Nees	•••	"	110

Ischæmum		Vol.	Page	Ischæmum	Vol.	
Colladoa, Spreng	•••	vii.	127	robustum, Hk. f	vii.	
commutatum, Hack.	•••	,,	131	Rottleri, Hk. f	"	127
conjugatum, Roxb	• • •	"	131	Royleanum, Miq	. 27	127
conjugatum, Thw	•••	"	130	rugosum, Salisb	"	127
corollatum, Nees	•••	22	139	scrobiculatum, W. & A	"	133
corrugatum, Ham	•••	"	127	secundatum, Walt	"	91
crinitum, Trin	•••	,,	141	segetum, Trin	"	127
cuspidatum, Roxb	•••	"	151	Sehima, Spreng	"	136
denticulatum, Ham	•••	"	142	semisagittatum, Rozb	"	130
diplopogon, Hk. f	•••	79	129	semisagittatum, Thw	"	131
ensiforme, Ham	•••	"	151	sparteum, Ham	"	129
falcatum, Thw	•••	77	140	spathiflorum, Hk. f	"	138
fasciculatum, Ham	•••	,,	31	speciosum, Nees	77	152
fasciculatum, Rottl	•••	,,	127	sulcatum, Hack	"	137
Feildingianum, Rendle	•••	"	132	tenellum, Roxb	"	136
geniculatum, Hochst.	•••	,,	127	tenue, Ham	"	133
geniculatum, Roxb	•••	"	133	timorevse, Kunth	"	136
glabratum, Presl	•••	"	133	sp., Griff	"	136
glabrescens, Ham	•••	"	31	sp., Trin	. "-	367
heterotrichum, Hack.	•••	"	134	Ischnochloa, Hk. f vii.		
hirsutum, Nees	•••	"	162		vii.	
hirtum, Hack	٤٠٠	"	135	Ischurochloa floribunda, Büse		
hispidum, H. B. K	•••	"	73	spinosa, Büse	.".	395
Huegelii, Hack	•••	"	139	Iseilema, Hack vii.		
imberbe, Hack	•••	"	127		vii.	
imberbe, Retz	•••	"	126	argutum, Anderss	"	218
impressum, Hack	•••	"	132	laxum, Hack	"	218
inscalptum, Hochst.	•••	"	136	prostratum, Anderss	79	218
involucratum, Russ	•••	"	151	Wightii, Anderss		218
involutum, Forst	•••	"	91	Isolepidis, sp., Kunth		619
Kingii, Hk. f	•••	"	129	Isolepis, Br	vi.	654
Kænigii, Hk. f	•••	"	127	ambigua, Zoll	"	656
laxum, Br	•••	"	136	angularis, R. & S	"	644
	`•••	"	140	articulata, Nees	"	656
Lisbose, Hk. f	•••	"	133	barbata, Br	"	651
longispicatum, Munro	•••	"	140	bispicata, R. & S	"	634
macrostachyum, Hochs		79	136 128	capillaris, D. Don	"	652 632
magnum, Rendle	•••	"		cochleata, Steud	"	646
mastucatum, Trin	•••	"	162	complanata, R. & S		619
melicoides, Kœn		70,		coronaria, R. & S	"	657
molle, Hk. f	•••	¥11.	128 136	corymbosa, R. & S Cumingii, Steud	"	652
montanum, Russ	•••	"	135	4 17.33	"	653
murinum, Forst	•••	"	132		"	636
muticum, Linn Myurus, Linn	•••	"	154		"	653
	•••	"	136	7	"	652
nervosum, Thw	•••	"	138	7 6 6		635
notatum, Hack	•••	"	142	1 1 16 1		643
paleaceum, Trin	•••	"	301		"	606
papposum, Rottl pectinatum, Benth	•••	19	140		"	635
	•••	"	140	1 62 6 5 6 6	"	647
pectinatum, Trin	•••	"	140		•••	653
pectinatum, Wight petiolare, Hack	•••	".	138	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	•••	645
	•••	"	130		"	658
ramosissimum, Hack	•••	"	137	January Danie	>>	657
repens, Roxb	•••	"	133	incurvata, Nees		656
a firm to the state	•••	"	135	involucellata, Stend		652
rivale, Hack	•••	"	100	i sicosimosimonia sociali	"	

Isolepis	Vol	. Page	Isonandra	1	Vol.	Page
kyllingioides, A. Rich.	vi		villosa, Wight			538
longispica, Steud	,,	649	Wightiana, A. DC	•••	,17	539
lupulind, Nees	,,	657	Isonema ovata, Cass	•••	_	235
maxima, Dietr	,,	660	I pteris penangiana, Wall.	•••	i.	208
Micheliana, R. & S	,,	662	Isopyrum, Linn adiantifolium, Hk. f. S		i.	23
miliacea, Presi	,,	644	adiantifolium, Hk. f. S.	T.	"	23
monostachya, Spreng.	••• ,,	634	anemonoides, Kar. & K	ir.	17	23
oligantha, C. A. Meyer	,,	654	grandiflorum, Fisch.	••	"	23 23
oryzetorum, Steud	,,	656 644	microphyllum, Royle	•••	"	23
P pentagona, R. & S.	••• ,,	656	thalictroides, Linn.	•••	"	532
prolongata, Nees puberula, Steud	••• ,,	653	Itaber, Koempf	•••	v. ii.	407
	••• ,,	665	chinensis, Hk. & Arn.	•••		408
77 75 4 0	,,	654	fragrans, Wall	•••	"	409
	,,	634	macrophylla, Wall	•••	"	408
Roylei, Nees	,,	657	nutans, Royle		"	408
setacea, Br	,,	654	Izeris, Cass		iii.	410
squarrosa, B. & S	,,	663	fontinalis, DC		"	410
subtristachya, Hochst.	,,	652	polycephala, Cass		"	410
supina, Br	,,	655	Ixia chinensis, Linn		νi.	277
tenuissima, D. Don	,,	652	IXONANTHEE		i.	410
	,,	644	Ixonanthes, Jack		i.	416
A	,,	652	cuneata, Miq		,,	416
trifida, Nees	,,	652	dodecandra, Griff	•••	"	416
	,,	666	icosandra, Jack	•••	"	416
uninodis, Delile	,,	656	khasiana, Hk . f	•••	"	416
	,,	635	obovata, Hk. f		"	417
	,,	651	reticulata, Jack	•••	.".	417
Willdenowii, R. & S.	, ,,,	646	Ixora, Linn	•••	iii.	137
sp., Wall vi. 398, 59			acuminata, Rozb	•••	19	137
? 628, 629, ? 631, 632			acuminata, Thw	•••	"	138
635, 637, 640, 641, 649			acutiflora. Reinw	•••	"	149 149
Toolekan amananalidi. A		2, 663	affinis, Wall	•••	"	145
Isolobus campanuloides, A.		. 425 425	alba, Roxb	•••	"	146
	,,	425	amœna, Wall arborea, Roxb	•••	"	142
	• iii		arborea, Koxb arborescens, Hassk	•••	"	143
To a construction and an a Dominion		542	Parguta, Br	•••	"	149
	",	546	Arnottiana, Miq		"	142
1117		546	attenuata, Wall	iii.	149,	
	••• ;,	541	Bandhuca, Roxb	•••	jii.	145
O3-11! TIP!-74	,,	539	barbata, Roxb	•••	,,	148
31-1 (111-	••• ,,	540	blanda, Ker		,,	145
man and the Miller of	,,	540	brachiata, Roxb		"	142
O.44- TTL	,,	543	Brandisiana, Kurz	•••	,,	142
hezandra, Griff	,,	543	brunnescens, Kurz	•••	"	143
lævifolia, Thw	,,	541	Brunonis, Wall	•••	,,	139
lanceolata, Wight	,,	539	calycina, Thw	•••	"	138
lanccolata, Thw	,,	541	Canjia, Wall	•••	**	147
obovata, Griff	,,	542	coccine, Linn	•••	"	145
	,,	541	coccinea, Curt	•••	,,	145
	,,	539	concinna, Br	•••	"	147
	••• ,,	589	congesta, Roxb	•••	17 -	146 143
	,,	548	coriacea, Br	•••	,,	140
	,,	542 541	corymbosa, Heyne	•••	"	145
G4 - 1-11 G1 - 1 -	,,	541 589	crocata, Lindl	4;;	144.	149
Stocksii, Clarke	••• ,,	000	cuneifolia, Rozb	****	_ ,	- 30

•			. •		
1 xora		Page	lxora		Page
decipiens, DC	. 111.	142		111.	141
? densa, Br	٠,,	149		,,	145
diversitolia, Wall	• ,,	141	subcapitata, Wall	;,	151
elliptica, Br	. ,.	143		,,	139
elongata, Heyde	. ,,	141	subulata, Teysm. & Bir	an ,,	149
erubescens, Wall	. ,,	149	Thozetia, F. Muell	,,	112
fulgens, Rorb	. ,,	146	Thwaitesii, Hk. f	,,	138
fulgeas, Wall	. ,,	146	tomentosa, DC	,,	150
glaucina, Kurz	. ,,	149	tomentosa, Roxb	,,	150
grandiflora, Br		145	tomentosa, Thw	,,	153
grandiflora, Schlecht		139	undulata, Roxb	,,	147
grandifolia, Zoll. & Mor.	"	143	villosa, Roxb	,,	144
grandifolia, Br		105	Wallichii, W. & A	,,	149
grandis, Miq		140	Wallichii, Wight	,,	138
Griffithii, Hook		146	weberæfolia, Kurz	,,	105
Helferi, Kurz		107	Wightiana, Wall	,,	139
incarnata, DC		145	IXOREÆ	iii. 20	137
incarnata, Roxb		145			
Johnsoni, Hk. f		139	Jackia, Wall	iii.	125
jueunda; Thw	.,	144	ornata, Wall		126
17 181 8		140	Jacgeria (lapsu Joegeria)		
Kurzeana. Teysm & Binn.		143	calendulacea, Spreng.		306
lasan lania (Islaha	• • •	138	Jaesohkea, Kurz		119
1		149	gentianoides, Kurz		119
		138		,,	119
leucantha, Heyne			latisepala, Clarke	"	119
longifolia, G. Dou		105	microsperma, Clarke	"	11,3
lucida, Br		148	Jambolifera pedunculata,		500
macrophylla, Br	. ,,	105	Gaertn	ii.	500
macrosiphon, Karz	٠,,	143		1.	498
memccylifolia, Kurz	• ,,	149	Jambosa acuminatissima,	••	400
merguensis, Hk. f	. ,,	140	Hassk	ii.	483
montana, Miq	. ,,	40	æmula, Bl	,,	472
naucleiflora, Kurz	. ,,	152	alba, Rumph	,,	474
nigricans, Br	٠,,	148	amplexicaulis, DC	,,	471
Notoniana, Wall	. ,,	139	aquea, DC	,,	473
oblonga, Br	. ,,	148	bifaria, Miq	,,	478
oblonga, Br	. ,,	149	bracteata, Miq	,,	485
obovata, Heyne		145	coarctata, Bl	,,	474
obtusata, Miq	. ,,	142	conferta, Korth	,,	480
opaca, Br		147	cylindrica, Thw	,,	480
owyphylla, Wall		139	densiflora, Korth	,,	473
paniculata, Rottl		149	domestica, Rumph	,,	471
paniculata, Lamk	• • • • • • • • • • • • • • • • • • • •	150	firma, Bl	,,	476
parviflora, Vahl		142	formosa, Walp	,,	471
Paretta, Andr		142	glabrata, DC	,,	480
Pavetta, Roxb		150	grandis, Bl	,,	476
pendula, Jack	• • •	141	inophylla, Miq	,,	481
pedunculata, Dalz		141	lata, Bl	• • • • • • • • • • • • • • • • • • • •	479
1 777 1		140	laurifolia, DC		478
Transfer Annual Day		145	lineata, DC	,,	487
1 1 187.11		144	macrocarpa, Miq	,,	174
17		197	1 11 110	,,	475
			1	,,	473
11	. 144,		madagascariensis, Bl.	"	471
rosella, Kurz		143 146	malaccensis, DC	,,	471
rugosula, Wall			mappacea, Korth	"	472
salicifolia, DC		146	media, Korth	••• ,,	472
? sessiliflora, Kurz	. ,,	147	nigra, Rumph	,,	7/6

Jambosa	77-1	D	I Taaminum	٠.		_
paucistora, Dalz. & Gibs.		Page 479	Jasminum		Vol. 1	
pulchella, Miq		492	glabrum, Horsf	•••	iii.	595
	,,		glabrum, Willd	•••	19	595
purpurascens, DC	••• ,,	471	glandulosum, Wall.	•••	23	599
purpurea, Wall	,,	472	grandiflorum, Linn.	• • •	"	603
rubricaulis, Miq	,,	487	Griffithii, Clarke	•••	,,	593
samarangensis, DC	••• ,,	474	Hamiltonii, G. Don	•••	"	599
sylvestris alba, Rumph.	,,	471	heterophyllum, Roxb.	• • •	**	601
tenuicuspis, Miq	• • • • • • • • • • • • • • • • • • • •	482	Heyneanum, Wall	• • •	"	592
tetraëdra, Mig	,,	476	hirsutum, Miq	• • •	77	593
Teysmanni, Miq	,,	480	hirsutum, Wall		"	593
vulgaris, DC	,,	474	hirsutum, Willd	iţi.	126,	592
urceolata, Korth	,,	476	humile, Linn		iıi.	602
_ Wightiana, Bl	,,	482	inodorum, Jacq		,,	602
Jardinea abyssinica, Steud.	iı.	148	intermedium, Wight	·	,,	599
Jasmineæ	iii.	590	lætum, Wall :		,,	545
Jasminum, Linn	ıii.	591	lancejfolium, Roxb		٠,	601
acuminatum, Heyne	,,	601	lanceolaria, Roxb		,,	601
adenophyllum, Wall.	.,,	597	latifolia, Roxb		,,	594
affine, Wight	,,	600	latipetalum, Clarke	•••	**	599
amplexicaule, Wall	,,	592	laurifolium, Roxb		,,	597
	• • • • • • • • • • • • • • • • • • • •	596	laurifolium, Gamble			599
angustifolium, Vahl		598	laurifolium, Wall		"	596
		597	Lessertianum, DC	•••	"	595
angustifolium, Wall.		597	ligustrifolium, Wall.		598,	
anhananana Dark	,,	594	1 36		iii.	594
, , ,	,,	594	malabaricum, Wight	•••		594
mustadands 187 m 11	••• ,,	592		•••	"	600
a share we have a Doub	••• ,,	599	mauritianum, Bojer	٠.٠	"	
	••• ,,		montanum, Roth		77	594
	••• ,,	601	multiflorum, Roth	•••	"	592
aureum, D. Don	,,	603	murtophyllum, Zenk.	•••	;•	598
	,,	600	nepalense, Spreng	•••	27	599
azoricum, Heyne	,,	601	nilagiricum, Hohen.	•••	79	600
	,,	595	nobile, Clarke	•••	"	597
bignoniaceum, Wall.	,,	602	nummularoides, Bl	•••	"	59 5
bracteatum, Heyne	,,	593	oblongum, Burm	• • •	"	603
	,,	593	officinale, Linn	•••	12	603
bracteatum, Wall	,,	595	ovalifolium, Wight	•••	,,	600
bracteatum, Wight	,,	592	ovatum, Wall		,,	601
brevilobum, $A. DC. \dots$,,	6 00	paniculatum, Roxb	•••	17	601
calophyllum, Wall	,,	602	parviflorum, Done		"	601
caudatum, Wall	,,	601	Perrottetianum, D.C		:,	598
chrysanthemum, Roxb.	,,	602	pubescens, Willd		,,	592 .
coerctatum, Roxb	,,	593	pubescens, Miq		"	593
congestum, Wall	,,	592	pubescens, Wall		"	591.
	,,	596	pubigerum, D. Don.		,,	602
	,,	602	punctatum, Wall		"	595
'' 1' TOI	,,	600	purpureum, Heyne		"	598
	,,	598	quinqueftorum, Heyne		"	591
1 777 77	,,	596	reticulatum, Wall	•••	"	593
11 1 . A	,,	599	revolutum, Sims		"	602
14711		602	rigidum, Zenk			598
1.0		596	rigidum, Thw		"	593
117.17		603	Ritchiei, Clarke	•••	"	598
0 11 17 17	•••	601	Rottlerianum, Wall.	•••	"	593
Commission Classicals	••	591	Roxburghiaum, Wall.		"	595
Gardnerianum, Wight	,,	599	Dambaa Alk	•••	"	591
	ii. 594		1 1 17 11	• • • •	"	5 95
glabellum, Wall i	UUT	, 500	scandens, Vant	•••	"	400

Jasminum	,	Vol.	Page	Johnia		Vol.	Page
scandens, Griff			592	Wightii, W. & A		ii.	183
sessiliflorum, Vahl		,,	597	Johrenia alpina, Fenzl	•••	ii.	
silhetense, Bl		,,	596	Jonesia Asoca, Roxb		ii.	271
simplicifolium, Benth.	•••	,,	599	pinnata, Willd	•••	,,	271
smilacifolium, Griff.		"	600	scandens, Roxb	•••	"	272
solenanthum, DC		,,	603	triandra, Roxb	•••	,,	272
stenopetalum, Lindl	•••	,,	596				178
subglandulosum, Kurz		"	600	lanceolata, Wight		v.	823
subtriplinerve, Bl		,,	596	latifolia, Wight	•••	,,	823
syringæfolium, Wall.		,,	5 95	Jossinia indica, Wight		iï.	
tetraphis, Wt. & Gardn.		,,	599	lucida, DC		,,	501
travancorense, Heyne	•••	,,	601	JUGLANDEÆ	•••	₹.	594
trichotomum, Heyne		,,	59 9	Juglans, Linn		v.	595
triflorum, Heyne		"	598	Parguta, Wall	•••		EOE
triflorum, Pers		,,	598	Catappa, Lour	•••	iï.	444
trinerve, Roxb		,,	596	pterococca, Roxb			596
trinerve, Valıl		"	5 96	regia, Linn		٧.	
trinerve, Wall		,,	596	villosa, Wall	•••		596
tubistorum, Roxb		,,	603	Julostyles, Thw	•••	ï.	333
undulatum, Ker		"	.592	angustifolia, Thw		,,	333
undulatum, Heyne		,,	592	JUNCACEÆ			392
undulatum, Willd		"	591	Juncellus, Kunth			594
rimineum, Willd		"	598	alopecuroides, Clarke		,,	595
Wallichianum, Lindl.	•••	"	602	inundatus, Clarke		"	595
Wightii, Clarke		"	598	lævigatus, Clarke			596
Zambac, Roxb		"	591	Monti, Rottb	•••	"	610
zeylanicum, Burm	•••	"	647	pygmæus, Clarke		"	596
sp., Griff	•••	"	592	serotinus, Clarke		"	594
sp., Hardwicke		"	602	stylosus, Clarke		"	595
sp., Hk. f. &. T. iii. 59	2. 5	93.		Juneus, Linn	•••	γi.	
5F1, 221 21 2 3 3 3 3			601	articulatus, Linn			395
Jatropha, Linn		٧.		benghalensis, Kunth			398
Curcas, Linn		,,	383	bracteatus, Buchen	•••	"	397
Curcas, Wall	•••	"	383	bufonius, Linn		"	392
glandulifera, Roxb		"	382	campestris, Linn		"	401
glauca, Vahl	•••	"	382	castaneus, Hk. f. & T.		"	398
gossypifolia, Linn	•••	"	383	chrysocarpus, Buchen.		"	394
heterophylla, Heyne	•••	"	382	Clarkei, Buchen	•••	"	400
moluccana, Linn	•••	"	385	communis, E. Mey	•••	"	392
moluccana, Hb. Russ.		"	383	compressus, Jacq		"	393
montana, Willd		"	462	concinnus, D. Don	•••	"	399
multifida, Linn		"	383	concinnus, Hk. f. & T.		"	398
nana, Dalz. & Gibs.		"	382	effusus, Linn		"	392
peltata, Wight	•••	,,	383	effusus, Steud		"	393
Wightiana, Muell		"	383	elegans, Royle		"	399
T 1		í.	593	filiformis, Linn		"	394
cristata, Wall		iv.	11	Gerardi, Loisel		"	394
Jerdonia, Wight		-	367	glauous, Ehrh	•••	"	393
2 32 177.1.2.4	•••	"	368	Grisebachii, Buchen.	•••	"	394
T 17 10 TF 13			323	himalensis, Klotz. & Gar		"	398
Vernah			323	Hoffmeisteri, Klotz		. ,,	398
	i	iii.	306	Andiam Danla	•••	"	396
T		i.	626	khasiensis, Buchen.	•••	**	3 99
1.11			626	lampocarpus, Ehrh	•••	"	395
		••	627	leptospermus, Buchen.	•••	"	396
Johnio, Wt. & Arn	i	ű.	183	Leschenaultii, J. Gay	•••	"	395
			210	leucanthus, Royle	•••	,,	397
congeous, Dans. a Citos.	•••	"	-10		•••	"	901

Junous	Vol.	Рада	Jussima	Vol	Рада
	vi.	Page 397	1.00	ii.	Page 587
maritimus, Lamk		8 93	14 1 10 - 1	,,	587
membranaceus, Royle		397	1 4	,,	587
minimus, Buchen		400	A	,,	587
monticola, Steud	-	3 96	L	,,	587
nematocaulon, Hk . f		400	longipes, Griff	,,	587
ochraceus, Buchen	,,,	394	octofila (octophila), DC.	,,	587
plumosus, Wall	. ,,	401		,,	587
prismatocarpus, Br	٠,,	395		,,	587
punctorius, Linn. f	,,	395		,,	587
scirpoides, Jacq	**	398		,,	587
scirpoides, Jacq sikkimensis, Hk. f	* **	399	1	,"	587
sinensis, J. Gay		396		iv	
sphacelatus, Done		3 98 398		,,	394
sphenostemon, Buchen		393	·	v. 556	
tenuis, Willd		397	1	iv	503
Thomseni, Buchen triglumis, Linn		3 96		,,	498
ii 1 '1 (7 100		396	alba, Koxb andrographioides, Clarke	,,	534
Wallichianus, La Harpe		396	argyrostachya, T. Ander	•	527
zebrinus, Gard. Chron		658	1	rø. ,, ,,	524
sp., Wall vi. 396			1	··· ,,	512
Juniperus, Linn		646		,,	537
communis, Linn		646	4.11	,,	528
densa, Gord		647		,,	395
elata, Roxb	.,	649	l marinetar i i	,,	525
excelsa, Bieb		647		,,	526
ewcelsa, Brand	,,,	647	bicalyculata, Vahl	,,	554
excelsa, Wall		646	biflora, Varl	,,	539
gossainthaneana, Lodd	,,	647	bivalvis, Linn	,,	552
indica, Bertol	97	646		,,	525
Lambertiana, Wall	"	647	boerhaaviæfolia, T. Ande	rs. "	535
macropoda, Boiss	,,	647		,,	529
nana, Willd	"	646	brachionoides, Spreng.	,,	529
Phillippsiana, Wall	,,	649		,,	531
Pseudo-sabina, Fisch. &		040	brunelloides, Lamk	,,	395
Меу	• • •	646		••• ,,	527
recurva, Ham		647		••• ,,	541
religiosa, Royle		647		,, v. 3 98	529
	. 647,	646	900 11		'
P Sabina, Hk. f. & T		647	1 7		535
squamata, Ham squamosa, Ham		647		,,	E +3O
Wallichiana, Hk. f. & T.	••	646	chinensis, Vahl	••• ,,	551
T · ~	iii.	378		5 3 , 554	
adenocarpa, Ledeb		372		iv.	
ceratocarpa, Benth	•••	378	307-11	••• ,,	489
chatolepis, Boiss		382	1	,,	502
gnaphalioides, Klatt		379		,,	511
macrocephala, Benth		878		••• ,,	528
modesta, Boiss		378	de america De mi	••• ,,	532
rosulata, Klatt	n	379	Jan 4040 1710in	,,	545
? Tricholepis, DC		383	dichotoma, Bl	,,	543
Jussima, Linn	22	587		,,	541
angustifolia, Lamk	***	587	diffusa, Willd	,,	538
Burmanni, DO	"	587		,,	544
decumbens, Wall	"	587	echioides, Linn	,,	505

Justicia	Vol.	Page	Justicia		Vol.	Page
Edgeworthii, T. Anders		536	notha, Clarke		iv.	537
clongata, Vahl		502	nummularifolia, Wall.		. ,,	506
emarginata, Nees		544	nutans, Burm		. "	521
fastigiata, Lamk		421€	ochroleuca, Bl		"	525
flaccida, Kurz		533	orbiculata, T. Anders.		"	539
flagelliformis, Clarke		535	orbiculata, Wall			538
flava, Kurz		531	orchioides, Griff		iv.	544
fragilis, Wall	"	528	oreophila, Clarke	•••		526
fulfida, Bl		524	orivensis, Roxb		"	529
gangetica, Lipp		493	7 416 377.31	•••	"	498
Gendarussa, Linn. f	,,	532	1	•••	,,	501
glabra, Kocn	;,	535	paniculata, Barm parviflora, Retz	•••	"	550
glandulosa, Wall	.,	505	1 1 1 1 T 2	•••	**	550
_11 _1 _1 T1 L	,,	506	peploides, T. Anders.	•••	**	537
1 75 1/2	"	529	- · · · - · ·	•••	"	545
	27	500		• • • •	"	493
	٠,	54S		• • • •	"	460
Aifalia /P 1l	"	528	polysperma, Roxb		"	539
	,,	543	procumbens, Linn	:	526	
	"	535			536,	
grossa, Clarke iv.	512				537,	
			Pseudo-Betonica, Roth	• • • •	iv.	
hedyotidifolia, Wall	i v .	538	ptychostoma, Wall.	•••	"	534
Helferi, Clarke	"	533	ptychostoma, Nee:	• • • •	"	534
heterocarpa, T. Anders	"	531	pubescens, Lamk	•••	,,	409
hirsuta, Vahl	٠,	345	pubigera, Wall	•••	• >	536
hirtella, Wall	,,	539	pulchella. Roxb	•••	**	120
Hookeriana, T. Anders	,,	532	punduana, Wall	•••	"	527
inconspicua, Wall	٠,	525	purpurca, Wall	•••	,,	557
infracta, Vahl	27	550	quadrangularis, Wall.		,,	512
infundibuliformis, Linn	,,	492	quadrifaria, Wall	• • •	"	530
khasiana, Clarke	٠,	537	quadrifaria, T. Anders.		"	530
Kurzii, Clarke	••	527	quinqueangularis, Kam		٠,	536
lætevirens, Vahl	,,	545	quinqueangularis, Wall.	•••	,,	538
lamifolia, Koen	"	395	ramosissima, Roxb		,,	525
lanceolaria, Roxb	"	555	repens, Linn		••	549
? latebrosa, Koen	11	551	repeus, Wall		••	549
latebrosa, Roxb	22	551	retorta, Vahl		٠,	55 1
latifolia, Vahl	,,	497	rosea, Vahl	•••	"	419
ligulato, Lamk	"	554	Rottleriana, Wall		:,	541
ligustrina, Vahl	,,	544	rotundifolia, Nees		,,	545
lineata, Wall iv. 504,	์ อับอี <u>,</u>	533	Roeburghiana, R. & S.	•••	,,	556
linifolia, Wall	iv.	548	Royeniana, Clarke		,,	537
livida, N968	,,	545	rubicunda, Ham		,,	498
lobelioides, Wall	,,	505	salicifolia, T. Anders.		,,	531
longifolia, Wall	"	525	salsoloides, T. Anders.		"	53 0
madurensis, Burm	;;	410	sanguinolenta, Vahl	•••	,,	510
Maingayi, Clarke	,,	534	scandens, Vahl			541
micrantha, Wall iv.	536,	539	serpyllifolia, Vahl			506
mollissima, Wall	iv.	539	serrulata, Wall		,,	509
montana, Wall	"	525	simplex, D . Don	•••	"	539
montana, Roxb	"	421	speciosa, Roxo	•••		556
Moretiana, Vahl	"	540	stricta, Vahl	•••		409
nasuta, Linn	"	541	sylvestris, Wall		,,	556
Neesiana, Wall	"	531	thyrsiflora, Roxb	···	,,	512
neilgherrensis, T. Anders.	"	526	tinctoria, Roxb		••	556
nervosa, Vahl	"	418	tomentosa, Boxb	•••	,,	395
nilgherrensis, Wall	"	526	tomentosa, Wall	···	"	395
(7)) 1	",	,		•••	"	

Justicia	Vol.	Page	Kæmpferia		Vol.	Page
tranquebariensis, Linn. f			scaposa, Benth			224
tranquebariensis, Roxb		529	secunda, Wall		,,	223
trinervia, Vahl	•••	526	sessilis, Kon		"	219
tubistora, Wall	•••	511	sikkimensis, King		"	223
umbellata, Wall		552	siphonantha, King		"	222
umbellata, Wall undulata, Vahl		555	specioss, Baker		"	220
Vahliana, R. & S		538	undulata, Link		"	219
Vahlii, Roth		538	versicolor, Salisb		"	222
vasculoss, Wall,		533	Kalanchoe, Adans		11,	414
ventricosa, Wall	• • • • • • • • • • • • • • • • • • • •	526	acutiflora, Haw		"	416
venusta, Wall	• • • • • • • • • • • • • • • • • • • •	508	acutiflora, Kurz		"	414
verticillata, Roxb		506	ægyptiaca, DC		"	414
virgata, T. Anders	• • • • • • • • • • • • • • • • • • • •	542	brasiliensis, Camb. (see			415
vitellina, Roxb	• • • • • • • • • • • • • • • • • • • •	512	crenata, Oliv			415
Wallichii, T. Anders	•••	542	floribunda, W. & A.		ii.	414
Wightiana, Wall		546	foribunda, Thw			415
wynaadensis, Wall		533	glandulosa, Hochst.		"	414
77 111	.,	530	grandiflora, W. J. A.		"	415
sp., Benth		547	heterophylla, Hb. Wigl		"	414
	. 497		laciniate, DC		"	415
~		389	nudicaulis, Ham		"	414
JUSTICIEÆ		000	olivacea, Dalz. (see Er		"	•••
Kadsura, Kæmpfer	. j.	45	pinnata, Pers	•		413
1 10 W-11		44	Ritchicana, Dalz	•••	**	41+
187-11		45	spathulata, DC.		**	414
		45	spathulata, Wall	•••	"	415
propinqua, Wall, Roxburghians, Arn.		45	teretifolia, Haw.		"	415
	• • •	45	1	•••	"	416
scandens, Bl		45	1 · · · · · · · · · · · · · · · · · · ·		"	414
Wightiana, Arn	''	218		•••	"	415
Kæmpferia, Linn		221		• • • •	."	437
Andersoni, Baker			Kandelia, W. & A	•••	11.	437
angustifolia, Rosc		219 222	Rheedii, W. & A	B1.	??	438
candida, Wall		221	Kanilia caryophylloides,		ii.	438
concinna, Baker	, ,	222	parvylora, Bl	•••	."	623
Crawfurdii, Wall			Karivia javanica, Miq.	•••	11.	625
diversifolia, Link	•	220	Rheedii, Roem	•••	"	624
elegans, Wall		222	samoensis, A. Gray	• • • •	"	625
Galanga, Linn		219	umbellata, Arn	••	"	425
Galanga, Willd	"	219	Katou Indel, Ham	•••	٧ 1.	276
humilis, Salieb	"	219	Kayea, Wall	• • • •	i.	
involucrata, King	"	221	cuspidata, Pl. & Tr.	••	,,	277
linearis, Wall	"	223	floribunda, Wall	•••	,, .	276 277
longa, Jacq	"	222		• • • •	"	
maorochiamys, Baker	"	228	racemosa, Pl. & Tr.		. 23	276
. marginata, Carey	"	219	stylosa, Thw	• • •	"	276
ovalifolia, Roxb	"	219		• •••	311.	101
ovata, Roxb	**	220	modesta, Hk. f	• • •	"	101
pandurata, Roxb	"	220	Kendrickia, Hk. f	•••	11.	526
Parishii, Hk. f	"	220	Walkeri, Hk. f	•••	."	5 26
parviflora, Wall	,,	221	Kentia, Steud	•••	۱¥.	84.
parvula, King	,,	223	morindæfolia, Steud.	•••	"	84
plantaginifolia, Salisb	,,	219	Kentia, Bl	•••		411
Prainiana, Kiny	**	220	paradoxa, Mart	D.C.		411
Roscoeana, Wall	,,	220	Kentrophyllum lanatum,			
Roscoei, Wall	. ,,	221		- ;; .		
rotunda, Linn	**	222	Keratephorus Leerii, Ha			
Roxburghiana, Schult	**	219	Wightii, Hassk	•••	**	548
			•			

Keratephorus	₩al	Page	Knoxia		Val '	Page
Wightii, Maingay	iii.	547	sumatrensis, Wall		iii.	129
Keyserlingia, Bunge	ii.	251	teres, DC			129
77·1 - 1	▼.	114				129
707		114		•••	,,	129
	"	114		•••	**	129
Coriacea, Endl	:"	552	Wightians, Wall	•••	"	51
Kibessia, DC	11.	552	Wightiana, Schl	•••	"	130
acuminata. Done	"	552	Zeylanica, Linn KNOXIEE	•	30	128
cupularis, Done	"	552				
pubescens, Dene	"	552	Kobresia, Willd	•••		695
simplex, Korth	"	553	angusta, Clarke	•••	"	697
tuberculata, Hk. f	??	111	brunnescens, Boeck	•••	"	697
Kiesera sericea, Reinw	ij.	93	capillifolia, Clarke	•••	"	698
Kingstonia, Hk. f. & T	i.		caricina, Willd	•••	"	699
nervosa, Hk. f. & T	"	93	curvirostris, Clarke	•••	**	697
Kirganelia dubia, Baill	₹.	288	Duthiei, Clarke	•••	"	697
eglandulosa, Baill	,,	288	elata, Boeck	•••	"	
intermedia, Baill	,,	288	filioina, Clarke	•••	"	696
multiflora, Baill	"	288	filifolia, Clarke	•••	"	699
multiflora, Thw	"	288	fissiglumis, Clarke	•••	"	696 coc
Prieuriana, Baill	,,	288	foliosa, Clarke	• • •	,,	696
puberula, Baill	,,	288	Hookeri, Boeck	•••	"	695
reticulata, Baill	, ,,	288	hyalinolepsis, Boeck.	•••	"	701
sinensis, Baill	"	288	laxa, Boeck	•••	"	698
Wightiana, Baill	?"	298	macrantha, Boeck	•••	"	699
Kittleocharis trigyna, Alef.	1.	412	nitens, Clarke	•••	"	697
Kleinhovia, Linn	i.	364	Pseudo-laxa, Benth	•••	"	698
Hospita, Linn	. ??	364	pygmæa, Clarke	•••	"	696
Kleinia Cusimbua, Loss	iii.	334	Royleana, Boeck	•	"	698
Klugia, Schlecht	Ĭ٧.	366	Royleana, Hend	•••	"	697
ampliata, Clarke	"	367	schoonoides, Boeck	•••	"	697
glabra, Gardn	"	366	schænoides, Hend.	•••	"	698
Notoniana, A. DC	"	366	scirpina, Boeck	•••	77	697 697
Notoniana, Hook	"	367 200	scirpina, Willd	• -::	e();	
scabra, Dalz. & Gibs	"	366 367	seticulmis, Boeck			696 697
zeylanica, Gardn	"	111	sibirica, Boeck	•••	₩i.	698
Ruema? corticosa, Lour	v.	111	stenocarpa, Clarke	<u>::</u> .	605	
P glaucescens, Jack	"	113	trinervis, Boeck		030,	.712 698
glaucescens, Wall	:::	128	uncinoides, Clarke vaginosa, Clarke	•••		695
Knoxia, Linn	iii.	130	17 - 17 - 10 is	•••	"	10
brachycarpa, Br	"	128	Outer at the management	•••	▼.	ii
corymbosa, Willd	"	129	1 17 Yer 1 .	•••	"	ii
exserta, DC	"	129	odontoptera, Schrenk	•••	"	11
1 1 DA	"	59	odontoptera, Moq	•••	"	îî
Heyneana, DC	"	129	prostrata, Schrad	•••	"	10
hirsuta, Arn	"	131	scoparia, Schrad		**	11
lævis, DC	"	130	sedoides, Sohrad	•••	"	10
microcarpa (macrocarpa),	"		stellaris, Belang			11
Kurz		130	stellaris, Moq	•••	"	11
mollis, W. Y A	"	129	Koeleria, Pers	•••	vii.	
mollis, Br	"	129	argentea, Griseb			309
plantaginea, Wall	"	130	aristata, Loisel		"	278
platycarpa, Arn	"	131	berythea, Boiss. & Bl.	•••	"	309
? stricta, Gærtn	,,	129	brachystachya, DC		"	309
stricta, Thw	"	129	brevifolia, Spreng		"	295
stricta, W. & A	"	130	brevifolia, Wight	•••	"	33 1
sumatrensis, DC	"	131	brevis, Stev		"	309
•					-	

Koeleria	Wa.	1 Dama			w.i	Page
1 1 24 1 2 1		l. Page ii. 336	Kraschninnikowia rupes		V 01.	LeRa
		900	Turez	,, ,,	i.	231
		900	Kuhlia morindafolia, Rei	n W	i₹.	84
7 4 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,	900	•Kurrimia, Wall		i.	621
77	-	900	bipartita, Lows			622
	,,	900	calophylla, Wall	•••	,,	622
	••• ••	300	ceylanica, Arn	•••	"	622
	,	208	Maingayi, Laws	• • •	,,	622
	,	200	1 107 17	•••	"	622
	,	991	paniculata, Wall	• • • •	**	622
7	,,	905	1 7	•••	"	622
7 1 2 11 72 13	,,	908	sp. ?, Wall	•••	ii.	408
	,,	208	1 ' · '	•••	₹.	547
	,,	3UR	1 15 31 31	•••	j.	348
	,,	300	1 ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	•••		333
	"	200		•••	"	333
	,,	974		•••	"	348
spicato Wilk, & Lange				•••	"	348
	,	, 278	fraterna, Roxh	•••	,,	
	,1		glabrescens, Mast	•••	,,	348
	,,		jujubifolia, Griff	•••	,,	333
	!	309	pulverulenta, Ham	• • •	,,	348
	11		Rozburghiana, Wight	•••	"	348
	,,		Kyllinga, Rottb	• • •	₹i.	587
Koenigia islandica, Linn	▼		albescens, Steud	•••	,,	667
monandro, Done	,,		aurata, Nees		,,	588
nepalensis, D. Don	,,	25	brevifolia, Rottb	•••	"	588
sp., Hk. f. & T	,,	25	brevifolia, ? Heyne		,,	587
Kohautia coccinea, Royle .	iii		brevifolia, Nees	•••	,,	588
	,,	68	brevifolia, Rottb		,,	620
1 17 31	,,	60	bulbosa, Kcen	•••	"	620
` C1 + C1	,,	CO	cruciata, Nees		,,	588
	i.		cylindrica. Nees		,,	588
	,,	617	cyperina, Retz		,,	621
3 · 'm'	,,	616	cyperoides, Roxb		,,	625
7- 1	ï.		fuscata, Miq	•••	"	588
	iii		fuscescens, Boeck	•••	,,	588
		620	gracilis, Kunth		"	588
		620	gracilis, Zoll		"	589
manronhalla Hk f	,,	620	intermedia, Br			588
	,,	690	melanosperma, Nees		"	588
	;;		Metzii, Steud		"	589
	▼1	475	microcephala, Steud.	•••	**	662
	•• ,,	176	mindorensis, Stoud	•••	. **	589
	,,	474		•••	"	588
	,,	474	monocephala, Rottb.	* • •	i,	587
ferox, Becc	,,		monocephala, Nees		"	589
	,,	476	monocephala, Strach.	•••	"	588
	,,		monocephala, Thunb.	•••	"	619
	,,		monocephala, Vahl	•••	"	
	,,	476	panicea, Rottb	•••	"	621
	,,	476	sororia, Kunth	•••	"	588
	,,	475	sororia, Miq	•••	"	589
	,,	475	squamulata, Vah!	•••	"	589
	,,	475	triceps, Rottb	•••	,,	587
Scortechinii, Becc	,,	475	triceps, Linn. f	•••	"	589
tenuissima, Becc	. ,,	476	triceps, Thunb	•••	"	588
wallichiæfolia, H. Wend	ι,,	475	umbellata, Rottb	•••	.".	622
Kosteletzkya pentacarpos, Lee	d. i.	324	umbellata; Roxb	vi.	621,	622

Kyllinga	Vol.	Page	Lactuca	7	Vol.	Page
	vi.	588	orientalis, Boiss			404
vaginata, Zoll sp., Wall. vi. 587, 588, 589,	597.	620	1 1 1 1 10 11		,,	410
	Vi.		ramosissima, Gren. & God		,,	404
				•••	"	407
Labiata, ? Griff iv.	572,	610			"	403
	iv.		1	•••	"	396
	iii.		minimata DO		"	403
pothoina, Lindl		518		•••	"	410
Lablab cultratus, DC	•••	209	7			410
leucocarpus, DC		209	1 110	•••	"	417
lignosus, Grah	"	209			"	401
microcarpus, DC	79	209		•••	"	404
nankinicus(nankinensis)DC	"	209		•••• •••	"	404
perennans, DC	••	209	0.2		"	403
vulgaris, Savi		209			"	405
Lachnaa eriocephala, Heyne		197	Otto - Latt Datas		"	405
Lachnagrostis ciliata, Munro					"	406
-212-4- Mana		264			"	404
Griffithiana, Munro	"	263		•••	"	404
77 1 1 57	"	265		•••	"	412
Hookeriana Manao	27	264		••	"	396
Hookeriana, Munro	956			•••	."	384
Hookeriana, Nees vii. Royleana, Nees	vii.	265	Lagaropysis gigantea, Miq. glandulosa, Miq	. • •	1♥.	383
	¥11.	264		•••	"	659
? Lachnastoma, Korth	iii.	154		•••	v.	659
		154		•••	.;;	302
triflorum, Korth	"	104			iii.	302
Lachnopodium rubrolimbatum	ii,	523		• • •	"	495
Bl		67		•••	VÌ.	496
Lacis Wallichii, Steud	▼.	402		•••	"	
Lactuca, Linn	iii.	405		• • •	"	496
amurensis, Regel arvensis, Edgew	"	405		• • •	" -	496 495
	"		Thereiters Francis	•••	"	
Benthamii, Clarke	"	411		• • •	"	496
bialata, Griff	"	405		• • •	"	495
bracteata, Hk. f. & T	"	409		• • •	ii.	613
bracteata, Wall	"	404		• • •	"	613
brevirostris, Champ	"	405		• • •	"	612
Brunoniana, Clarke	"	406		• • •	"	613
Clarkei, Hk. f	"	406		•••	.!?.	613
decipiens, Clarke	"	407		•••	iii.	248
dissecta, D. Don	"	405		• • •	"	248
Dubyssa, Clarke	"	409		•••	"	248
glabra, DC	"	396		· · ·	.??	248
graciliflora, DC	"	406		•••	11.	575
gracilis, DC	"	410		• • •	"	576
hastata, DC	"	407	corymbosa, Griff	•••	"	576
Heyneans, DC	"	403		•••	"	577
Hoffmeisteri, Klotz	, ,,	408	elegans, Wull	• • •	,,	575
lævigata, Clarke	"	408			"	575
lævigata, DC	"	411		••	"	577
Lessertiana, Clarke	"	408		• • •	,,	577
longifolia, DC	>>	405			"	579
macrantha, Clarke	,,	409			,,	577
macrorhiza, Hk. f	,,	408			"	576
napifolia, DC	"	395	hypoleucs, Kurz		"	577
nudicaulis, Murray	,,	416	indica, Linn		"	575
obtusa. Clarke	"	416	lanceolata, Wall	•••	"	576
			-			

Lagerstræmia	Wal	Page	1 Vol	Page
lanceolata, Bedd	••	575	Lancretia suffruticosa, Del. i.	251
macrocarna. Wall		577	Langeveldia acuminata, Gaud. v.	566
microcarpa, Wight parviflora, Roxb		576	Langsdorffia indica, Arn v.	238
parviflora, Roxb		575	Languas aquaticum, Kon vi.	256
pubescens, Wall		578	sylvestre, Kon ,,	256
Reginæ, Roxb		577	evilages Konn	253
Rottleri, Clarke		576	Lansium, Rumph i.	557
tomentosa, Presl		578	anamalayanum, Bedd "	558
venusta, Wall		576	aqueum, Miq ,,	558
villosa, Wall		578	cinereum, Hiern ,,	558
Laggera, Sch. Bip	•••	270	domestioum, Jack ,,	558
alata, Sch. Bip		271	humile, Hassk	558
arida, Clarke		273	javanicum, Rosm ,,	558
aurita, Sch. Bip		271	pedicellatum, Hiern ,	558
divaricata, Oliv		271	silvestre, Rosm ,,	559
flava, Benth		270	sp., W. & A ,,	562
pterodenta, Benth		271	Lantana, Linn iv.	562
Lagonychium Stephanianum			aculeata, Linn ,,	562
M. Bieb	• ••	288	alba, Schauer ,,	562
Lagopsis incana, Bunge		671	annua, Hort. Calo ,,	563
Lagoseris tenuifolia, Rchb	. iii.	395	Camara, Linn ,,	562
Lagotis, Gaertn		558	canescens, Hort. Calc ,,	564
Clarkei, Hk. f		559	collina, Done ,,	562
decumbens, Rupr		559	crenulata, Otto & Dietr "	563
		559	dubia, Wall iv. 562	563
glauca, Gaertn globosa, Hk. f		558	indica, Roxb iv.	562
spectabilis, Hk. f		560	indica, Wall ,,	563
stolonifera, Koch		558	la'ifolia, Tausch ,,	562
Laguna (Lagunea), Cav		336	mista (? mixta), Linn "	562
aculeato Cav		340	repens, Sprong ,,	563
lobata, Willd		336	sarmentosa, Spreng "	563
sileniflora, Wall		336	scabra, Wall ,,	563
Lagunea, Lour		30	trifolia, Linn ,,	563
cochinchinensis, Lour	. ,,	30	Wightiana, Wall ,,	562
Lagurus cylindricus, Linn		. 106	sp., Hk. f. & T iv. 562	564
Lahaya corymbosa, Schult		245	Laportea, Gaud v.	549
spadicea, Schult	. ,,	245	crenulata, Gaud ,,	550
Lallemantia, Fisch. & Mey		666	evitata, Wedd ,,	549
Royleana, Benth	11	667	gigantea, Guud ,,	550
Lamarkia, Moench	• • •	307	latifolia, Gaud "	550
aurea, Moench	. ,,	3 07	oleracea, Wedd ,,	549
Hookeriana, Griff	. ,,	307	terminalis, Wight ,,	549
Lamium, Linn	. iv.	678	Lappa major, Gertn iii.	359
album, Linn	. ,,	679	minor, Schkuhr "	859
amplexicaule, Linn	. ,,	679	tomentosa, Lamk "	359
petiolatum, Royle	. ,,	679	? Lappago aliena, Spreng. vii. 50	
rhomboideum, Benth	. ,,	678	bistora, Roxb vii.	97
Lampetia racemosa, Rosm	. i.	512	Latipes, Stead "	97
Lamprachsenium, Benth	. iii.	228	occidentalis, Nees "	97
microcephalum, Benth		229	racemosa. Honck	97
Lamprocarpus thyrsiflorus, Bl	. vi.	367	Lapsana, Linn iii.	391
Lamprodithyros paniculatus			communis, Linn ,,	392
Hassk	. vi.		Koelpinia, Linn ,,	392
protensus, Hasak	. "	382	LARDIZABALEA i.	107
Lampuzium minus, Ramph	. vi.	249	Larix, Miller v.	655
Lances, Hk. f. & T	. i v .	260	Grifithiana, Gord "	635
tibetica, Hk. f. & T	. ,,	260	Griffithii, Hk. f. F. T "	655

	Vol	Page	Lasianthus		Vol.	Page
Larysacanthus ciliatus, Oeret.			longifolius, Wight		ıii.	187
Laserpitium ? coniifolium,			lucidus, Bl		,,	184
Wall. :	ii.	700	Maingayi, Hk. f		"	188
striatum, Wall	"	699			"	190
sp., Wall		695	Moonii, Wight	•••	"	180
Lasia, Lour	" V1.	550	nitida, Thw. ?	•••	"	189
desciscens, Schott	"	550	obliquus, Thw		"	192
Hermanni, Schott		550	oblongifolius, Bedd.		"	183
heterophylla, Schott	"	550	obovatus, Bedd		"	186
Jenkinsii, Schott	"	550				183
D	"	550	Oculus-cati, Miq		"	179
spinosa, Thw	"	550	oliganthus, Hk. f	•••	,•	186
Zollingeri, Schott	"	550	parvifolius, Wight	•••	"	186
Lasiagrostis alpina, F. Schm.	wi.	23 0	pauciflorus, Wight		"	189
Jacquemontii, Munro		232	pilosus, Wight	•••	"	182
	"	229	plagiophyllus, Hance	•••	"	180
2 4 14	",	232	pterospermus, Wight	•••	"	188
, , , , , ,	"	233	retosus, Wight	•••		181
	"	229	rhinophyllus, Hk. f.	• • •	"	185
* • • • • • •	′,	58 1	4 4 3877	•••	"	185
and an Maria	1.			• • •	"	179
apicalis, Thw ? lanceolata, Mast	"	584	Roxburghii, Wight	•••	••	180
Main mani - Wast	"	585 505	sikkimensis, Hk. f stercorarius, Kurz	•••	,,	183
	"	585		•••	"	179
malaccensis, Mast	**	584	stipularis, Bl	•••	,,	185
secundiflora, Miq	"	584	strigillosus, Hk. f	•••	"	189
P tetandra, Wall	"	586	strigosus, Wight	•••	"	
prasina, Miq		587	tentaculatus, Hk. f.	•••	"	181
Lasianthus, Jack	111.	178	Thwaitenii, Hk. f	•••	"	185
acuminatus, Wight	"	185	truncatus, Bedd	• • •	"	189
acuminatus, Wight	"	185	tubiferus, Hk. f	•••	"	183
and a manious, Hk . f	"	189	tubiflorus, Bl	•••	"	197
appressus, Hk. f	"	181	varians, Hk . f	•••	,,	191
attenuatus, Jack	"	181	venosus, Wight	:	"	188
Biermanni, King	,,	190	venulosus, Wight	•••	"	190
Blumeanus, Wight	"	184	Walkerianus, Wight	•••	,,	186
bracteatus, Wight	"	179	Wallichii, Wight	•••	"	180
capitulatus, Wight	"	191	Wightianus, Hk. f	•••	_ ",	188
chinensis, Benth	"	187	sp., Wall ii. 179, 1	80,		
ciliatus, Wight	,,	184	Lasiobema anguina, Miq.	•••	ii.	284
constrictus, Wight	"	188	Horsfieldii, Miq	•••	"	284
orinitus, Hk. f	"	182	Lasiococoa, $Hk. f.$	•••	₹.	456
cyanocarpus, Jack	,,	179	symphilliæfolia, Hk . f .	•••	"	456
densifolius, Miq	,,	182		•••	vi.	748
dichotomus, Wight	"	191	Bennettii, Planch	•••	i.	519
P dubius, Wight	"	167	brevifolia, Boeck		vi.	748
ellipticus, Wight	"	182	multijuga, B enn	•••	i.	519
fætens, Wight	,,	193	paucijuga, Benn	•••	,,	519
Gardneri, Hk . f	"	186	Lasiolytrum hirtum, Stev	ıd.	₹1i.	146
Griffithii, Wight	"	179	pilosum, Steud	•••	, ,,	146
Helferi, $Hk. f. \dots \dots \dots$	"	189	Lasiopogon, Cass		iii.	287
Hookeri, Clarke	"	184	lanatum, Cass		17	287
inconspicuus, Hk. f.	"	187	muscoides, DC		"	287
Jackianus, Wight	"	180	T - 1 1 1 70		٧.	197
Kurzii, Hk. f	"	183	and a section of the land of the section of the sec		"	197
lævicaulis, Karz	,,	179	Hugelii ? Meissn	`		197
lancifolius, Hk. f	"	187			"	197
longicauda, Hk. f	"	190	Metzianus, Miq		"	197
• • • • • • • • • • • • • • • • • • • •	••	- '	,		.,	-

Lasiosiphon	371	12ama 1	Laurus - Vol. Page
scandens, Endl		Page	2 . 107 107
		197	foribunda, Wall v. 118, 140
T. 1. 10		197	glandulifera, Wall v. 135
Lasiostoma formicarium,	",		glaucescens, Ham ,, 135
Spreng		194	1 140
Lasiostyles salicifolia, Presi		444	grandis, Wall v. 143, 146
Lasiurus hirsutus, Boiss			Gullawara, Ham v. 152
Lathrea, Linn	iv.	317	Heyneana, Wall ,, 136
squamaria, Linn		318	incrassata, Jack ,, 126
Lathyrus, Linn	ii.	179	indica, Lour , 139
altaicus, Led		180	involucrata, Koen, 158
angulatus, Benth	"	180	involucrata, Vahl ,, 179
Aphaca, Linn		179	lanceolaria, Roxb ,, 141
cashmericus, Royle	"	180	lanceolata, Wall ,, 141
erectus, Lag		189	ligustrina, Wall ,, 142
himalensis, Camb	-	178	lucida, Bl ,, 143
inconspicuus, Linn		180	? lucida, Wall ,, 147
luteus. Baker		180	macrantha, Wall ,, 141
ovatus, Royle		180	? macrophylla, D. Don v. 181, 186
pratensis, Linn		180	macrophylla, Wall v. 129
sativus, Linn		179	malabathrica, Soland ,, 136
sphæricus, Retz		180	malabathrum, L.? ,, 130
tingitanus, Linn		#180	malabathrum, Wall. v. 130, 132
Latipes, Kunth	-77		Nacusua, D. Don v. 184
senegalensis, Kunth		97	nitida, Roxb ,, 130
Launæa, Cass	• • • •	414	nitida, Wall , 182
aspleniifolia, Hk. f		415	oborata, Ham ,, 153
chondrilloides, Hk. f		415	obtusifolia, Roxb., ,, 129
glomerata, Hk. f		417	odoratissima, Wall v. 139, 859
microcephala, Hk. f		415	paniculata, Wall ,, 142
nudicaulis, Hk, f		416	Parthenoxylon, Jack ,, 136
pinnatifida, Cass		416	peduncularis, Wall ,, 144
secunda, Hk. f		416	porrecta, Roxb ,, 136
Laureola fragrans, Rom		499	pubescens, Wall ,, 142
Laurinea ? Griff	•••	575	recurvata, Roxb ,, 129
LAURINEÆ		116	rigida, Wall ,, 136
		7, 161	Sailyana, Ham ,, 128
Laurus albiftora, Wall	_		salicifolia, Ham ,, 141
amygdalina, Hum		118	salicifolia? Wight ,, 174
attenuata, Wall		143	sericea, Wall ,, 139
Bazania, Ham		129	? smilacifolia, Wall ,, 136
Bejolyhota, Ham		129	Soncaurium, Ham ,, 128
bilocularis, Roxb	• • • • • • • • • • • • • • • • • • • •	122	Tamala, Ham ,, 128
	. 189	, 861	Tazia, Ham ,, 128
? camphorata, Ham		141	umbellata, Ham ,, 180
Cassia, Burm	. ,,	132	villosa, Roxb ,, 140
Cassia, Ham		129	viminea, Wall ,, 131
Cassia, Linn		179	zeylanica, Herm ,, 179
Cassia, Roxb		12 8	Lavallea, Baill i. 579
caudata, Wall	. ,,	134	ceylanica, Baill ,, 579
Champa, Ham v	. 13), 86L	Lavandula, Linn iv. 630
Cinnamomum, Roxb		132	Burmanni, Benth ,, 681
? Culitlaban, Roxb	. ,,	130	carnosa, Linn ,, 627
cuspidata, D. Don		195	Gibsoni, Grah ,, 631
declinata, Bl		142	Lawii, Wight ,, 631
dubia, Wall		132	multifida, Burm ,, 631
dulcis, Roxb		136	Perrottetii, Benth , 631
· ·			

, Vol	. Page	Leea	V.	l. Page
Lavatera, Linn i.		0.7. 7. 787.11	'i	40
kashmiriana, Camb ,,	319	L	··· -	ecu
	. 242	24 m.m. 1011 D1	,	007
carnosa, Wall	040	7 4 717 11	··· ,	cec
dentata, Wall "	24;			565
erecta, Wall ,,	0.40	7-416-11-337-11		
erecta, Wall ,,, fastigiata, Bl ,,	243	1 11 15 1		CCA
an amondadla Di	242	1 0 11 100		CCE
parvistora, Bl ,,	242	7		660
riaida Wall	248	44.77 TO C		CCC
mugana Wight	243	11 1 777 17		ccc
mineida Wall	242		,;	CCE
Lawia acuminata, Wight iii	96	11 77	,,	ece
longipes, Tal v.	63	1 D . 2		667
mulaballa Wal	62	7 7 7		cer
zeylanica, Tul ,,	62	1 1 1 1 1 1 1 1 1	·· "	000
Lawsonia, Linn ii.		9 . 377 11		666
alba, Lamk	573	1		0.00
ingrais Roch	573	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		664
purpurea, Lamk ii. 573, ii				667
spinosa, Linn ii.		1	,,	666
Lebidiera malabarica, Muell. v.	276	1 A 18 11-1. T	,,	RRR
mallida Wmall	279	1 7 7	", Vi	_
natula Mnoll	279	1		95
etimulanie Maoll	282	Day	•• ,,	94
Lebidieropsis collina, Muell. v.	274	1	17	94
orbioulania Manill	274	1	. ,,	94
I about a star at a star at	331	1 11 50		94
1 177 11	331	l i i 'a	,,	94
procumoens, Wall ,, Lecananthus, Jack iii.		hexandra, Sw	•	94
ernhaggang Isal	100	mexicana, H. B. K		94
en Cuist	100	oryzoides, Sw	• • •	435
	3	LEGNOTIDEA:		~~~
nenalousie Rianh	3	Legouinia amabilis, Muell		56
Lecanthus Wedd	559	LEGUMINOSÆ		346
Lecanthus, Wedd v. major, Wedd ,	559	Leiocarpus serratus, Hassk.		
madunantania Wada	559	Leiocarya Kotschyana, Hoch		TOT
Wallishii Wadd	559	Leiospermum ferrugineun Wall		726
Wightii Wadd	559			725
Task and the very training	252	ferrugineum, Wight		
I.marmaran	463	Leleba lineata, Rumph		
Ledebouria hyacinthina, Roth vi.	348	Rumphiana, Kurz		39 3 556
maculata Dala	348	Lemns, Linn		558
Toon Linu	664	arrhiza, Linn		557
Manusch and West	666	oruciata, Roxb		556
manata DC	667	gibba, Linn		558
wanta Whill	666	globosa, Roxb		557
alata Vidaan	665	major, Griff	. ,,	991
ananatifalia I	645	melanorrhiza, F. Muell.		557
717 77		(lapsu Spirodela)		
administra 7	665	minor, Linn	•	556 556
2000 mar abid 17	667	minor, Griff		
condata Wall	668	obcordata, Ham	•	556 557
Acricaca I	665	oligorrhiza, Kurz		557 557
oriano Willd	665	orbiculata, Roxb		557 556
differen Laura	667	paucicostata, Hegelm	"	556
aiaantaa Crist	666	pleiorrhiza, F. Muell.		E = P
gigantea, Grin ,,	000 1	(lapsu Spirodela)	* **	557

Lemna	Vo.	l. Page	Lepidagathis	Ve	l. Page
	vi			iv	
	,,			,	, 521
	,,		incurva, D. Don	,	, 521
	Vi			,	
Lencymmæa, Presi	ii .	. 512	linearis, T. Anders	. ,	, 521
LENTIBULARIE.E	í⊽	. 328		. ,	800
Leobordea lotoides, Del.	ii	. 64	lutea, Dalz		E 177
Leonotis, Br.	iv	. 691	lutea, Dalz mitis, Dalz		E1Q
nepetæfolia, Br	,,	201	mucronata, Noes		601
Leontodon eriopodum, D. Do			Neesiana, Wight		492
eriopus, Spreng	,,	401	nervosa, Wight	. ,	522
glaucescens, M. Bieb.	,,	401	neurophylla, T. Anders	. ,	521
? Kunthianum, Wall	,,	369	prostrata, Dalz		ETO
	,,	40L	pungens, Nees		517
Leontoglossum scabrum, Hau		31	purpuricaulis, Nees		510
Leontopodium, Br	., iii.	. 278	rigida, Dalz,		510
alpinurg, Cass	,,	279	ripario, Nees		591
7: 7	. ,,	279	rupestris, Bedd		£ 1/7
monocephalum, Edgew		279	Typestris, Nees		
Leonurus, Linn		677	scariosa, Nees		
Cardiaca, Linn		678	semiherbacea, Nees		521
globosus, Moench		₩91	Shuteri, T. Anders		516
heterophyllus, Sweet		678	simplex, T. Anders		520
indicus, Burm		691	sphærostachya, Nees		491
Marrubiastrum, Burm		689		.,	517
pubescens, Benth		678	spinosa, Wight striata, Nees		520
Royleanus, Benth		678	strobilifera, Stocks		519
sibiricus, Linn		678	strobilina, T. Anders		523
tartarieus, Burm		678	subuninervia, Clarke		519
Leopardanthus scandens, Bl.	vi.	19	terminalis, Hochst	,,	520
Lepeocercis annulata, Nees	vii.	197	trinervis, Nees	"	517
? digitata, Nees		210	ustulata, Nees	**	521
digitata, Royle	• • •	196	Walkeriana, Nees		522
pertusa. Hasak		173	sp., Griff	:)	521
serrata, Trin	. ,,	196	sp., Hk. f. & T	"	517
Lepidadenia ferruginea, Miq.	٧.	160	LEPIDINEÆ	1.	130
Griffithii, Wight		172	Lepidium, Linn	i.	159
ovalifolia, Wight		173	capitatum, Hk. f. & T	,,	160
Wightiana, Nees		180	chalepense, Schrenk		160
Lepidagathis, Willd	. "	515	Draba, Linn	"	160
aristuta, Nees		521	incisum, Edgew		160
Beddomei, T. Anders		516	latifolium, Linn	"	160
calycina, Hochst		519	repens, Boiss	."	160
ceylanica, Nees	"	522	ruderale. Lian.	"	160
chlorostachya, Nees		519	ruderale, Linn. sativum, Linn. LEPIDOCARPEA	"	159
clavata, Dalz		518	LEPIDOCARPEA	٧i.	404
oristata, Willd	"	516	Lepidocoma trifoliatum,	٠	•.,,
cristata, Wall	"	517	Jungb	ii	229
ouspidata, Nees	"	519	Lepidopelma podocarpifolia,	•••	
diffusa, Clarke	"	518	Klotz	₹.	266
dulcia. Nees	"	520	Lepidosperma, Labill	vi.	676
dulcis, Wall	••	515	chinense, Nees & Mey		676
£-14- W7-11	,,	515		"	674
	"	522	Lepidostachys grandifolio,	"	917
assurais Dala	"	522	Planch		351
	••	478	Griffithiana, Planch.	• .	349
T7 '14	.,,	516			351
namitoniana, Wall	"	י טוט	OHEREN, AUGUSTO	**	301

•			
Lepidostachys	Vol.	Page	Vol. Page
macrophylla, Talasne	. v.	346	Leptochlos, Beauv vii. 297
? oblonga, Wall	,,	348	arabica, Kunth ,, 297
	,,	350	bipinnata, Hochst ,, 325
Roxburghii, Hk. f. & T	. ,,	35Q	calycina, Kunth ,, 297
Rosburghii, Wall	. ,,	348	chinensis, Nees ,, 299
? villosa, Wall	,,	346	coromandeliana, Stend ,, 297
	ľ. i.	147	cynosuroides, R. & S ,, 299
pedunculosus, Hk. f. § 7		147	filiformis, R. & S ,, 298
Lepigonum, Fries		244	filiformis, Beauv , 299
	i.	583	? fusca, Kunth , 329
	,	583	gracilis, Wight ,, 297
Lepironia, Rich	. v i.	684	? monastachya, R. & S ,, 293
	,,	680	Neesii, Benth ,, 298 obtusifiors. Hochst 299
	,,	682	2 mmissides Winks 70
	,,	683	9 marking to Vomenty MOA
	,,	683	7
	,,	684	
	"	681 679	7 1 1 72 13 " 000
	. 1.	680	9 77 41 900
	,,	680	D 1 0 " 900
, D1	,,	679	tripogonoides. Manro , 286
	i▼.		uniflora, Hochst ,, 297
A 101		216	verticillata, Kunth ,, 295
A	,,	216	Wijhtiana, Nees , 327
~	,,	206	sp., Wall ,, 298
707 - 114 - 1 ** (A) - 1		216	Leptocnide borbonica, Bl v. 581
	·· ,,	488	Leptocodon, Hk. f. & T iii. 430
Leptacanthus alatus, Wigh			gracilis, Hk. f. & T ,, 430
L.Dianidan Mana	,,	475	Leptocoma racemosa. Less iii. 248
1 1 17	,,	475	Leptodermis, Wall iii. 198
117-11 NT	,,	475	Griffithii, \hat{H}_{k} . f ,, 198
Walkeri, Wight	. ,,	476	lanceolata, Wall ,, 198
Leptadenia, Br	iv	. 63	scabrids, Hk. f ,, 199
	,,	63	virgata, Edgew ,, 198
7 . CM7. 1 .	,,	68	sp.? , 199
gracilis, Done	,,	64	Leptodesmia, Benth 11. 152
	٠,,	63	congesta, Benth , 152
Jacquemontiana, Done	,,	64	Leptolepis tibetica, Boock. vi. 660, 712
pyrotechnica, Done.	,,	64	Leptonema melanthesioides,
reticulate, W. & A	,,	63	Muell ▼. 328
	,,	64	Leptonium oblongifolium, Griff i. 583
Leptanthe macrostachya,	•_	178	
Klotz	. i⊽.	177	2000
Leptanthes verticillata, Wigh		659 05	
Leptaspis, Br		. 95 95	970
	,,	95 95	Leptopus cordifolius, Done. v. 284
	"	95	Leptorhabdos, Schrenk iv. 303
	,,	95	Danahamiana Walu 909
Leptatherum Royleanum,	. ,,	50	linifolia, Walp ,, 304
Noos		. 118	parviflora, Benth ,, 303
Leptobæa, Benth	iv	368	virgata, Benth ,, 303
glabra, Clarke		368	Leptospartion grandiflorum,
7.10	. ,,	368	Griff ii. 579
pubescens		368	LEPTOSPERME ii. 462
pubescens Leptocarpæa Læselii, DC	., ï.	151	Leptospermum, Forst ii. 484

Leptospermum			Vol.	Page	Lettsomia		Vol.	Page
amboinense, Bl .	•••		ii.	464	barbigera, Clarke			193
flavescens, 8m			,,	464	bella, Clarke		,,	192
floribundum, Jungl			,,	464	Bona-nox, Roxb	•••	"	184
			"	461	bracteons, Clarke	•••	"	192
scabrum, Wall.	• • •		"	407	capitata, Miq		"	193
stamineum, Wall.			"	407	cuneata, Roxb		"	191
Leptostachya dich			"		cymosa, Roxb			190
Nees		•••	iv.	543	elliptica, Wight		"	192
virgata, Nees			,,	542	elliptica, Wight	•••		195
Wallichii, Nees				512	hancorniæfolia, Clarke		"	196
zeylanica, Nees			"	532	hirsutissima, Clarke		"	193
Leptostemma fascicula			" ì∀.	50	? Kurzii, Clarke		**	196
hirsutum, Bl				50	Maingayi, Clarke		"	195
Lepturus, Br			vii.	365	mysorensis, Clarke		• • •	192
aciculatus, Stend.				365	nervosa, Hort	•••	"	187
fasciculatus, Trin.			"	153	1 ' •	•••	,,	185
repens, Br			,,	365		•••	"	183
Roxburghianus, St.		•••	**	365		•••	,,	193
Lepurandra saccidora,			"	537	peguensis, Clarke	•••	"	196
			٧.	241	penangiana, Miq	•••	"	188
holosteoides, Fenzl	•••	•••	١.		pomacea, Roxb	•••	,,	
		•:•	"	241 242	rubeus, Clarke	• • •	**	195
	•••	•••	."		rubicunda, Clarke	•••	"	195
Lespedeza, Mich		•••	ii.	142	setosa, Roxb	• • •	"	194
argyræa, Sieb. & Zu		•••	,,	142	sikkimensis, Clarke	•••	"	194
bicolor, Turcz	•••	• • •	"	143	speciosa, Roxb	•••	,,	183
cuneata, G. Don	• • •	• • •	**	142	splendens, Roxb	•••	,,	186
decora, Kurz	• • •	• • •	19	144	strigosa, Roxb	•••	,,	193
elegans, Camb	• • • •	•••	"	143	Thomsoni, Clarke	• • •	,,	193
	• • •	•••	٠,	143	unijlora, Roxb		,,,	184
eriocarpa, DC	•••	• • •	,,	144	Leucæna, Benth		ii.	290
Gerardiana, Grah.	•••	•••	,,	142	glauca, Benth	•••	"	290
glomerata, Hornem.			٠,	143	Leucas, Br		iv.	680
hirta, Elliott	•••		,,	143	angularis, Benth	•••	"	684
ındica, Spreng	• • •		,,	220	angustifolia, Wall		,.	682
involucrata, Wall.			,,	229	aspera, Spreng		,,	690
junces, Pers	• • •		,,	142	aspera, Hohen		,,	691
juncea, Wall	•••	ii.	94,	142	biflors, Br		"	683
kanaorensis, Camb.			ii.	142	bistora, Wall		,,	683
lagopoides, Pers.	•••		,,	156	capitata, Desf		"	689
lineata, Pers			,,	228	Cephalotes, Spreng		"	689
macrosty la, Baker			.,	148	chinensis, Br		"	68 L
			,,	144	ciliata, Benth		,,	687
parviflora, Kurz			19	144	Clarkei, Hk . f		"	688
			"	145	collina, Dalz		"	681
D 7 361			,,	144			,,·	684
			"	142	decurva, Benth		"	688
sericea, Royle		•••	"	144	diffusa, Benth		"	689
FR94			"	144	dimidiata, Spreng		"	691
		•••	"	143	dimidiata, Benth	•	"	690
			"	142	777 6		"	686
			"	143	flaccida, Br		"	684
T			iŸ.	191	7 1	•••	"	686
				196	? Hamiltoniana, Benth.		,,	682
D 1		•••	"	191	TT -14. * 121 /	•••	"	681
			••	185	helianthemifolia, Desf.			685
atropurpurea, Clark		•••	"	194	helianthemifolia, Benth.		"	687
1 1 - 4 - C17 1		•••		195	1		"	687
	•••	•••	"	-00	and, oprong	•••	"	301

Leucas	Vol.	Page	· Vo	l. Page
	. iv.	690		ri. 278
involucrata, Benth		689		ii. 386
lamiifolia, Desf		686	1	,, 387
lanata, Benth		681	1	, 386
lanceæfolia, Desf		685	amageabilia D. Don	, 386
lanciformis, Wall		685		i. 627
lavandulæfolia, Sm		691		COO
lepistoma, Hb. Wight		686	D1	,, 628
linifolia, Spreng		690		,, 627
longifolia, Benth		684	. ()_:00_11: III. (200
marrubioides, Desf		683	Matana i Dain	690
marrubioides, Wall		K84		,, 026 11. 355
martiniconsis, Br		688		ii. 477
melissaflora, Benth		684	- lamma Inde	4777
melissæfolia, Benth		684		177
membranacea, Benth		680		i. 121
mollissima, Wall		682	. automéran Di	199
		632		v. 699
TITE)		682	: annum E.v.	600
	"	681	l = . ' '-	i 111
5 × 1		658		. 231
	• • • • • • • • • • • • • • • • • • • •	682	Wabbinas Wall	990
		694		
	′′	683	CI-140 A L. Same City and a	100
DI. Lander Donald	"	690	2 bataah man oin DC	457
		688		·
polycephala, Wall		683		
procumbens, Desf		633		
procumbens, Thw		684		10
pubescens, Benth		684		, 16 . 16
pubescens, Thw.	-	685		
rosmarinifolia, Benth			Lhodra cratægoides, Done ii	
rufescens, Benth	.,	637	Liatris lobelioides, Wall ii	
stelligers, Wall		686 688	Libanotus asiaticus, Stackh. i	
stricts, Benth			Libanus thurifera, Colebr i	-
strigosa, Benth	• • • • • • • • • • • • • • • • • • • •	692		7. 645
suffrutioss, Benth	.,	685	1	v. 787
teres, Benth		680	nambieda Maut	i. 430
ternifolia, Desf		685		, 433
urticæfolia, Br		680	ferrugines, Becc ,	
vestita, Benth	.,	686 689	glabra, Griff ,	
Walkeri, Benth		690	horrida, Bl ,	
Wightians, Benth		689	Kingiana, Becc ,	499
zeylanica, Br			Kunstleri, Becc ,	
zeylanica, Dalz	,	631		, 431
Leucoblepharis subsessilis,	:::	070	malayana, Becc ,	
Arn		276	modesta, Becc ,	, 433
Leucocasia gigantea, Schot	t Vi.	524	paludosa, Griff ,	
Leucocephala graminifolia,		£09	paludosa, Kurz ,	490
Roxb		582	peltata, Roxb ,	
spathacea, Roxb		578	pusilla, Becc ,	433
Leucococcus orientalis, Liebm	. ₹.	588	ramosa, Bl ,	, 431
Leucocodon, Gardn		93	Scortechini, Becc ,	107
reticulatum, Gardn	11	94	spinosa, Wurmb ,	
Leucodermis (Leucoderis)	•	COE	triphylla, Griff	, 432
javanica, Planch		605		i. 429
Leucodictyon malvensis, Dalz		100	i in the state of	ii. 349
& Gios	ii.	19 2	arhicoides, DC ,	, 351

Ligularia	Vol.	Page	Ligustrum vol.	Page
arnicoides, Wall	. iii.	332	robustum, Bedd iii.	615
corymbosa, DC	. ,,	3.18	robustum, Thw ,,	614
frigida, Schultz	,	351	robustum, Wall ,,	616
nana, Done		357	Roxburghii, Clarke ,.	615
palmata, Hk. f. & T.		331	spicatum, Ham ,,	617
pinnatifida, Hk. f. & T		332	Uva-ursi, Done ,,	617
racemosa, DC		350	vestitum, Wall ,,	617
reniformis, DC		331	Walkeri, Done ,,	614
retusa, DC		350 -	Wallichii, Bl ,,	617
sibirica, Cass	. ,,	350	sp., Griff	616
sp., Hk. f. & T. :		331	sp., Hk. f. & T. iii. 614, 616,	617
Ligusticum, Linn	• •	698	Liliacea, Griff vi.	355
Ajawain, Fleming	. ,,	682	LILIACEÆ vi.	299
Ajouan, Roxb	٠,,	682	Lilium, Linn vi.	349
angelicoides, Wall		703	Bakeria num, Hemsl. & Coll. "	350
Benthami, Wall.		703	Patisua, Ham ,,	350
Brunonis Wall	. ,,	706	claptonense, Hort ,,	351
Candollii, Wall		703	cordifolium, D. Don "	349
coniifolium, DC	,	700	giganteum, Wall ,,	349
dentatum, Wall		704	Hookeri, Baker ,,	352
diffusum, Roxb		693	longijlorum, Wall ,,	350
elatum, Clarke		698	longifolium, Griff ,,	352
Govanianum, Wall		702	Lowii, Baker ,,	350
indicum, Wall		693	Metzii, Steud ,,	350
marginatum, Clarke		698	nanum, Klotz ,,	352
? meoides, Jacquem		671	neilgherrense, Wight	350
? nepalense, D. Don		720	neilgherrense, Hemsl. &	
obtusiusculum, Wall		673	Coll , ,,	351
pumilum, Wall		704	neilyherricum, Lem ,,	350
rotundatum, Wall		703	nepalense, D. Don,	850
striatum, DC		699	nepalense, Coll. & Hemsl,	350
Thomsoni. Clarke		698	ochroleucum, Wall ,,	351
Ligastrum, Linn	• • •	614	oxypetalum, Baker ,,	353
bracteolatum, D. Don	. ,,	617	polyphyllum, D. Don ,,	351
Candolleanum, Bl		615	primulinum, Baker ,,	351
Candolleanum, Done		615	punctatum, Jacq ,,	351
ceylanicum, Done	,,,	614	roseum, Wall	352
compactum, Hk. f. S T		616	roseum, Wall ,,	352
compactum, Done	. ,,	615	stylosum, Klotz ,,	351
confusum, Dene		616	sulphureum, Baker ,,	351
Decaisnei, Clarke		616	Thomsonianum, Royle "	352
grandiflorum, Wall	. ,,	617	Thomsonianum, Lindl "	352
kumaonense, Done	, ,,	617	triceps (lapsu Fritillaria),	
laurifolium, Roxb		618	Klotz ,,	353
lucidum, Aiton	٠,	615	tubiflorum, Wight "	350
Massalongianum, Vis	. ,,	616	Wallichianum, Schultes f,,	349
microphyllum, Wight		616	Wallichianum, Wight "	350
microphyllum, Bedd	. ,,	616	Limacia, Lour i.	100
Myrsinites, Dene		617	Amherstiana, Miers "	100
neilgherrense, Wight		615	cuspidata, Hk. f. & T "	100
neilgherrense, Done	, ,,	616	distincta, Miers ,,	100
nepalense, Wall		617	inornata, Miers "	100
parviflorum, Vis		617	oblonga, Miers ,,	100
Perrottetii, A. DC	,,	615	triandra, Miers ,,	100
pubescens, Wail	"	614	velutina, Miers ,,	100
punctatum, Griff	,,	614	Wallichiana, Miers ,,	100
robustum, Bl	,,	614	Limatodes gracilis, Lindl v.	855

Limatodes	Val	Page	Limnophila	V ol	Page
labrosa, Rohb. f		856	1 4 - 0 13	. iv.	
mishmensis, Lindl. & Paxt.		817	Dunal.	. ,,	266
rosea, Lindl	"	856	Dankanakii A Dan	,,	265
Limeum, Linn	ii.	664	Dankennkii Dankh	. ,,	271
indicum, Stocks	,,	664	D	. ,,	266
Limnanthemum, S. P. Gmel.		131	I am make Classed	,,	266
aurantiacum, Dalz	,,	132	:11:4 D1	,,	270
bistorum, Thw	"	132	nanilidana Chief	·· ,,	272
calycinum, Miq	"	132	tillæoides, IIk. f.		270
oristatum, Griseb		131	1 C 1 C	· ,,	271
Forbesianum, Griseb	"	132		• • •	266
indioum, Thw	"	131	7	vi.	
Kleinianum, Griseb	"	131	- b. 4 10-11 10-1		560
Moonii, Thw		132	Limodorum angustifolium, Ha		
nymphæoides, Link	"	131	aphylium, Rozb		739
parvifolium, Griseb	"	132	bicallosum, Ham		196
TIT! I A! Co.:	,,	132	Links Doub		2
Limnochloa. Nees vi.	625	628	bidentatum, Willd		197
. 1 37	vi.	627	bracteatum, Rozb	• • • • • • • • • • • • • • • • • • • •	818
* . * * *		627			817
7 4 · 37	"	626	1 7 13 1		18
*	"	627			856
	"	62 6	.7		-
	"	020	1 1 1 1 1 1 1 1		41
Limnogeton (Limogeton) sp.,	vi.	564	1 , , , , , ,		4
Edgew		265		•	
Limnophila, Br	i⊽.	266	ensatum, Thunb		14
balsamea, Benth	"		epidendroides, Willd.	,,	l ou
Benthamiana, Miq	**	271	Flos aeris, Sw	,.	28
campanuloides, Benth	,,	80	graminifolium, Ham.		857
camphorata, Benth	"	267	liliiflorum, Willd		
cana, Griff	"	269	longifolium, Ham	-	12
chamædrifolia, G. Don	"	273	D - 1	,,	13
conferta, Benth	"	266	nutans, Roxb		16
diffusa, Benth	*,	266	pusillum, Willd		37
diffusa, G. Don	"	267	ramentaceum, Roxb	٠,,	4
elongata, Benth	"	271	recurvum, Roxb	. ,,	17
erecta, Benth	"	267	retusum. Sw	,,	32
gratioloides. Br	000	271	roseum, D. Don		124
	263,		spathulatum, Willd	• • • • • • • • • • • • • • • • • • • •	51
	iv.	271	striatum, Reinw		854
Helferi, Hk . f	"	269		. vi.	44
heterophylla, Benth	**	270	Tankervilliæ, Roxb		816
hirauta, Benth	**	263	veratrifolium, Willd		851
hypericifolia, Benth.	"	269	virens, Sw		1
hyssopifolia, Roth	,,	272	Limonia, Linn	. i.	507
laxa, Benth	11	267	acidissima, Linn	• ,,	507
laxa, Benth	,,	267	alata, $W. \& A$. ,,	508
Menthastrum, Benth	"	265	alternans, Wall	,,,	508
micrantha, Benth	"	267	alternifolia, Kurz	• ,•	508
myriophylloides, Roth	,,	271	? angustifolia, Wall	٠,,	500
polyantha, Kurz	"	268	arborea, Roxb	٠,,	500
polystachya, Benth	,,	269	bilocularis, Roxb	. ,,	508
pulcherrima, Hk . f	11	267	? caudata, Wall		513
	268,		citrifolia, Roxb	٠,,	510
	i▼.	266	crenulata, Roxb	٠,,	507
$\mathbf{pygm} \mathbf{zea}, Hk. f. \dots \dots$	"	268	diacantha, DC		507
racemosa, Benth	,,	271	? flavicans, Wall	. ,,	508

Limonia	Vol.	Page	Lindera		Vol.	Page
grandistora, Wall		510	malaccensis, Hk. f		٧.	183
Laureola, DC		499	Meissneri, King		,,	182
Laureola, Wall		499	melastomacea, Benth.	٧.	185	862
leptostachya, Jack i. 492,	▼.	3 78	Neesiana, Benth		,,	186
		, 513	nerrosa, Kurz		,,	161
missionis, Wall 510 missionis, Wight		513	oxyphylla, Benth		•	183
mollis, Wall	, ,,	504	pulcherrima, Benth.		,,	185
monophylla, Linn	. ,,	512	reticulata, Benth		,,	183
oblonga, Wall i.	503,	510	? sikkimensis, Meissn.		,.	187
oligandra, Dalz	, i.	497	triloba, Hk. f. & T		1,	186
pentagyna, Roxb	٠,,	508	venosa, Benth		٠,	184
pentagyna, Roxb	. ,,	531	Lindernia japonica, Thunk	٠.	iv.	259
pentaphylla, Retz	,,	500	Kitaibelii, G. Don		,,	281
? pubescens, Wall	11	507	? micrantha, D. Don		,,	283
pusilla, Gærtv	,.	191	pyxidaria, All		,,	281
retusa, D. Don	. ,,	508	sesamoides, Spreng.	• • •	"	273
scandens, Roxb	• • • • • • • • • • • • • • • • • • • •	50 9	LINEÆ,	• • •	i.	409
_ trifoliata, Linn		507	Linociera, Swartz	•••	iii.	607
Limosella, Linn	iv.		acuminata, Wall	•••	,,	610
aquatica, Linn	,,	288	albidiflora, Clarke	•••	,,	608
diandra, Linn	,,,	288	continifolia. Vahl	•••	,.	611
Linaria, Juss	iv.		dichotoma, Wall	•••	,,	608
cabulica, Benth	• ••	251	insignis, Clarke	•••	,,	610
incana, Wall	17	252	intermedia, Wight	•••	**	609
minor, Desf	11	252	laxiflora, Bl	•••	"	610
ramosissima, Wall	"	251	leprocarpa, Clarkc	•••	,,	608
Roylei, Chav		251	? loranthifolia, Wall.	•••	"	611
sphærocarpa, Benth	,,	252	macrophylla, Wall.	•	,,	610
striata, DC		251	malabarica, Wall	•••	11	607
triphylla, Mill	•	251	minutiflora, Clarke	•••	**	610
Lindelofia, Lehm		159	Muelleri, V. Hourck	•••	,,	611
anchusoides, Lehm		161	? oblonga, Wall	• • •	"	609 609
Benthami, Hk. f		159	panciflora, Clarke	•••	"	609
spectabilis, Lehm	•	159 261	pauciflora, Wall	•••	"	608
Lindenbergia, Lehm		262	purpurea, Vahl	•••	٠,	611
abyssinica, Hochst		261	1 4 m	•••	**	608
grandiflora, Benth		262		•••	,,	611
Griffithii, Hk. f		261	tenuiflora, Wall	•••	,.	610
Hookeri, Clarke macrostachys, Benth		262	Wightii, Clarke	•••	"	608
macrostachya, Benth philippensis, Benth		261	sp. Hk. f. & T		"	610
polyantha, Royle		262	Linostoma, Wall		₹.	197
siamensis, Miq	' ''	262	decandrum, Wall	•••	,,	198
urticæfolia, Lehm	•	262	pauciflorum, Griff			198
sp., Hk. f. & T	• • •	261	1		4 ٠.	198
Lindera, Thunb v		, 862	siamense, Kurz		. "	198
assamica, Kurz		182	Linnm, Linn		i.	410
bifaria, Benth		184	Cicanobum, D. Don		,,	412
bootanios, Meissn		186	corymbulosum, Rchb.		"	411
caudata, Benth		184	humile, Heyne		,,	411
citriodora, Hk. f. (Aperula,			humile, Mill		"	411
BL)		183	mysorense, Heyna	•••	,,	411
Griffithii, Meissn	,,	187	perenne, Linn		,,	411
heterophylla, Meissn	",	186	repens, D. Don		,,	412
Hookeri, Meissn		156	Stocksianum, Boiss	•••	,,	411
Kingii, Hk. f		183	strictum, Linn		"	411
latifolia, Hk. f		183	tetragynum, Colebr.	•••	"	412
=						

Linum	F-1	Do	Liparis Vol. 1	D 2 000
	i.	Page 412	1 30	707
trigynum, Roxb		411	1 12	699
trinervium, Hohen	"	410	lamminan Lindl	703
trinervium, Roth	,,		longipes, Lindl ,,	
usitatissimum, Linn	٠,	410	luteola, Lindl ,,	704
Liparis, Rich	٧.	691	macrantha, Hk. f ,,	704
acuminata, Hk. f. v. 696			macrocarpa, Hk. f ,,	696
alata, A. Rich	▼.	707	Mannii, Rehb. f ,,	701
angustifolia, Thw	,,	701	mucronata, Lindl ,,	706
atropurpurea, Lindl	,,	698	nepalensis, Lindl ,,	693
atropurpurea, Wight	٠,	695	nervosa, Lindl vi.	182
auriculata, Rehb. f	,,	701	? nesophila, Rchb. f v.	703
barbata, Lindl	,,	696	obcordata, Vahl "	707
Beddomei, Ridl	,,	695	obscura, Hk. f v. 701, vi.	182
bidentata, Griff	,,	707	odontostoma, Rchb. f v.	707
biloba, Wight	,,	699		698
bistrista, Par. & Rehh. f.	"	702		694
bituberculata, Lindl	"	696	alianana Wimbt	699
	νi.	100	owbiantania Lodd	702
bootanensis, Ridl	ν.	700		700
		703	paradoxa, Rehb. f. v. 697, vi.	
	,"	699		182
brachyglottis, Rchb. f	"	782	7. 7. 7.	704
bracteosa, Wall	,•	701	mandula Lindl	703
cæspitosa, Ridl	••			706
campylostalix, Rchb. f	٠,	694	,	700 702
Catheartii, Hk. f	"	694	Fig. 2. 10 10 10 10 10 10 10 10 10 10 10 10 10	
compressa, Lindl	,,	706		6 95
	"	704		706
$cordifolia, Hk. f. \dots \dots$,,	692		700
Cumingii, Ridl.	••	707	, , , , , , , , , , , , ,	690
Dalzellii, Hk. f	,,	698	, , , , , , , , , , , ,	693
decurrens, Ridl	,, ,	705		701
decursiva, Rchb. f. v. 707,	٧i.	183	reflexa, Lindl vi.	183
deflexa, <i>H</i> k. f v. 697,	vi.	181	resupinata, Ridl. v. 765, vi.	183
	v.	705	Ridleyi, <i>Hk. f.</i> v.	705
densiflora, A. Rich	,,	691	robusta, Hk. f vi.	182
10 10 10 10	,,	693	rostrata, Rchb. f v.	644
	V).	152	rupestris, Griff ,,	692
distans, Clarke v. 704,	₹i.	183		694
	v.	706	Scortechini, Hk. f. v. 703, vi.	182
	٧i.	183		702
	v.	701		41
elegans, Lindl		699		703
elliptica, Wight	"	704		707
ferruginea, Lindl	"	697	stenoglossa, Par. N. Rehb.f	697
flaccida, Rchb. f. v. 703,	"		Stricklandiana, Rchb. f. ,,	707
	v.	693	tenuifolia, Hk. f vi.	182
		663	Thwaitesii, Hk. f. v. 692, vi.	
	"	182		182
g		706	m + 1 + 1 + 1 + 1	695
gregaria, Lindl			4 1 4 1 7 3 3	70 8
Griffithii, Ridl v. 7		707		69 5
	▼.			703
	••	704		
? intermedia, A. Rich	"	690	Wallerday Ourt	704
Jovis pluvii, Par. & Rehb.		697		698 200
lacerata, Ridl	,,	702		699
	".	700	Wightian a, Thw v. 692,	
latifolia, Lindl. v. 703,	vi.	182	Wightii, Rchb. f v.	704

Liparis	Vol. Page	Litsma	Vol. 1	Page
	vi. 181	Beddomei, Hk. f	T.	177
seylanica, Ridl. v. 7	708, vi. 183	Blumii, hk.f. (vide Tetr		
	vi. 667	thera)	,,	160
D	,, 667	castanea, Hk. f	,,	171
2-1: W:-	,, 677	° cauliflora, Moon (▼	ide	
lævigata, Nees	,, 667	Tetranthera)	,,	167
microcephala, Kunth	,, 668	chartacea, Wall	,,	170 .
	,, 663	chinensis, Lamk	,,	158
	,, 667	citrata, Bl	*** ;;	155
	,, 667	citrata, Herb. Calc	,,	156 179
	,, 668	consimilis, Nees	,,	177
sp., Wall vi. 58	57, 602, 667	cordata, Hk. f	,,	166
Lippaya telephioides, Endl		coriaces, Hk. f ? Cuipala, Nees	11	178
** * * ** **	5.00	elongata, Benth. & Hk.	··· "	165
	" 569	ferruginea, Bl		160
Liquidambar Altingia, Bl.		firma, Hk. f	,,	162
	490	foliosa, Nees	,,	178
	490	furfuracea, Nees	,,	178
Liriodendron grandistoru		fuscata, Thw	•••))	178
	i. 41	Gardneri, Meissn	,,	176
1.77 1.4 TO 1	,, 40	geminata, Bl	,,	158
Liriope spicata, Lour		glaberrima, Hk. f	,,	173
Lisianthus zeylanicus, Spr		glabraria, Juss	,,	158
Listers, Br	vi. 103, 180	glabrata, $Hk. f$,,	174
	vi. 104	gracilipes, $Hk. f.$,,	159
ovata, Br	,, 104	grandis, Hk . f	,,	162
pinetorum, Lind/	,, 104	Helferi, Hk. f	,,	172
reniformis, D. Don	" 152	Hookeriana, Hk . f	,,	166
tenuis, $Lindl.$	" 104	iteodaphne, Thw	,,	173
Lithagrostis Lacryma-Jo		Pkhasiana, Meissn	,,	169
Gærtn	vii. 100	khasyana, Hk. f	,,	164
Lithospermum, Linn	iv. 174	khasyana, Hb. Calc.	••• ,,	164
	, 174	Kingii, Hk. f	,,	156
	,, 166	Kurzii, King	,,	164
	, 170	læta, Benth. & Hk. f.	,,	169 158
	, 170	lævis, Juas	,,	159
	, 177	lancifolia, Hk. f	,,	178
heliotropoides, Forsk.	, 149	lanuginosa, Nees	,,	170
hispidissimum, Lehm.	, 176	leigntha, Hk. f	rio "	110
hispidum, Forsk	150	leiantha (error for		154
leucophlæum, Schweinf.	170	phylla) leiophylla, Hk. f	*** . "	910
	172		••• ,,	158
officinale, Linn	171	longifolia, Benth. & R	k f "	167
ovalifolium, Done retortum, Pallas	700	longipes, Meissn		172
retortum, Pallas secundiflorum, Done.	. 170	macrophylla, Kurz	"	151
tenuidorum, Linn. f.	175		,,	175
vestitum, Wall	176	Maingayi, Hk. f Mannii, King	••• ,,	180
viridiflorum, Roxb	" 146	martabanica, Hk. f	,,	164
Litsæa, Lamk	v. 155	Meissneri, Hk. f	,,	169
albicans, Hk. f	, 171	membranifolia, Hk. f.	••• ,,	159
amara, Bl	, 163	mishmiensis, Hk. f	••• ••	161
ambigua, Meissn	,, 158	monopetala, Pers	,,	162
angustifolia, Hk. f	,, 169	multiflora, Bl	,,	158
angustifolia, Kurz	, 152	myristicæfolis, Hk. f.	,,	172
assamica, Hk. f	, 161	nemoralis, Trim	,,	167
VOL. VII.	••	•	X.	

Litsma	Vo	l. Page	Lobelia		Vol.	Page
nemoralis, Trim		. 166	anceps, Linn. f		iii.	425
nitida, Hk. f		, 174	arenarioides, A. DC.	•••	"	425
nuculanea, Hk. f		, 166	aromatica, Moon		"	427
oblonga, Wall		189	begoniæfolia, Wall	•••	"	422
oblonga, Nees		170	cæspitosa, Bl			425
	•	150	campanuloides, Thunb.		"	425
oleoides, Hk. f		175	chenopodifolia, Wall.		"	423
1 1 1 111		7 750	chinensis, Lour		"	423
oroscularis, TDW	-	156	Cliffortiana, Linn		"	423
oreophila, Hk . f ovalifolia, $Trim$	-	179	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		"	426
		175	decurrens, Roth	•••	"	425
Panamonja, Hk . f penangiana, Hk . f		171	1 3	•••	"	425
	•	171	1	•••	"	424
petiolata, Hk. f		150		•••	"	426
platyphylla, Pers		, 168	erecta, Hk. f. & T	•••	"	427
polyantha, Juss			excelse, Leschen	•••	"	421
rangoonensis, Hk. f	•	, 163	frutescens, Linn	•••	,,	423
rugosa, Kurs		, 180	gratioloides, Roxb	٠	"	424
salicifolia, Hk. f		, 167	Griffithi, Hk. f. & T.	•••	٠,	425
scrobiculata, Meissn	٠.,	, 178	Heyniana, R. & Sch.	•••	"	
		7, 158	hirta, Wight	•••	"	424
semecarpifolia, Hk . f	. 🔻		Horsfieldiana, Miq	•••	"	422
serices, Hk. f	-		Lobbiana, Hk. f. & T.	•••	79	424
sessiflora, Hk. f	. ,		micrantha, Hook	•••	"	425
Stocksii, Hk. f	. ,		microcarpa, Clarke	•••	"	424
striolata, Bl	. ,		mishmica, Clarke	•••	"	426
striolata, Moissu	. ,		montana, Beinw	•••	"	423
Tetranthera, Mirb	. ,,	158	nicotiansofolia, Heyne	•••	"	427
Thomsonii, Hk . f	. ,		Nummularia, Lamk.	•••	"	422
tomentosa, Heyne	. ,	157	Plumieri, Burm	•••	"	421
trinervia, Juss	. ,	178	Plumieri, Linn	•••	,,	421
umbrosa, Nees	. ,;	179	? pumila, A. DC	•••	"	428
undulata, Hk.f	٠,,		purpurascens, Wall		"	426
velutina, Bl	. ,		pyramidalis, -Wall	•••	"	426
venulosa, Hk. f	. ,	, 161	radicans, Thunb	•••	"	425
Wallichii, $Hk. f.$. ,,	160	rosea, Wall	•••	"	427
Wightiana, Benth. & Hk. f.	. ,,	107	Sebæ, A. DC		"	425
zeylanica, C. & T. Nees	. ,,	170	stipularis, Roth	•••	,,	423
LITSEACEE			subcuneata, Miq		"	424
Livistons, Br	. 🔻	i. 434	subincisa, Wall		"	425
chinensis, Br		434	subracemosa, Miq		,,	425
cochinchinensis, Mart	,,,	484	Taccada, Gaertn	•••	"	421
Diepenhorstii, Toysm		198	terminalis, Clarke		"	434
Jenkinsiana, Griff		102	trialata, Ham		"	425
Kingiana, Becc		4QE	triangulata, Roxb		"	423
sinensis, Mart		494	trichandra, Wight		"	427
speciosa, Kurs	•••	485	trigona, Rosb		"	423
spectabilis, Griff	,,	435	trigona, Hk. f. & T		,,	425
Lloydia, Salisb	Ψi		trigona, Roxb		,,	425
alpina, Salisb	,,	354	4 (79)	•••	,,	425
himalensis, Royle	"	354	umbrosa, Hochst	•••	"	425
kunawarensis, Royle	"	356	Wallichiana, Hk. f. & T.		"	426
longiscapa, Hook		854	777 711 7 11 Ct		"	426
Al Dall	"	354		•••	"	425
Lobbia dependens, Planch	₹.			•••	"	424
Lobelia, Linn	• • • •	1				423
affinis, Wall		424	LOBELIEE	•••	iii.	
	,	425	Lobocarpus Candolleanus, W	. A. A	\. V	316
alata, Heyne	73		Com Pas Canton Month and		••	

		Vol.	Page	Lonicera	Vol.	Page
Lobophyllum tetrandru	m.			Loureirii, Hk. f. & T	. iii.	10
F. Muell		iv.	144	macrantha, DC		10
Lodicularia capensis, Nee			153	microphylla, Willd		15
fasciculata, Beauv			370	17 - 187 : 1. A		10
		"	158	* 34 TTL # 6. IT	. ,,	13
fastigiata, Beauv	•••	"				14
Hamiltoniana, Nees	• • • •	"	154	obovata, Royle	. ,,	
laxa, Nees	•••	"	153	orientalis, Lamk	. 11	15
peruviana, Meyen	• • •	,,	153	ovata, Ham	. ,,	11
Læstingia indica, Retz.		i.	245	oxyphylla, Edgew	. ,,	16
LOGANIACEE Lolium, Linn annuum. Lamk		i▼.	78	parvifolia, Edgew	. ,,	13
Lolium, Linn		vii.	364	purpurascens, Hk. f. & T	7. ,,	12
annuum, Lamk		"	364	quinquelocularis, Hardw		14
arvense, With	•••		364	Royleana, Wall		14
coelorachis, Forst		"	365		. 17	13
· · · · · · · · · · · · · · · · · · ·	•••	"	364	'' D		12
italicum, A. Br	•••	"				15
multiflorum, Lamk	•••	,,	364	Sieversiana, Bungo		
perenne, Linn	•••	"	365	spinosa, Jacquem	. ,,	13
rigidun s , Gaud	•••	"	364	stipulata, Hk. f. & T	. ,,	17
robustum, Rchb	•••	11	364	tomentella, Hk. f. & T	. ,,	12
speciosum, Stev		11	364	Webbiana, Wall		16
temulentum, Linn		"	364	Wightiana, Wall		12
vulgare, Host		"	365	sp., Griff		11
Lomatogonium carinthiae		"		· · · · · · · · · · · · · · · · · · ·	iii.	1
		iv.	120	Lontanus domestica, Rumph		482
A. Br Lomatolepis, Cass glomerata, Cass	•••	iii.	417			
Lonatotepis, Case	•••				. vii	
giomerata, Cass	•••	"	417		. ,,	831
Lonchomera, Hk. f. & T.	•••	i.	93		,,	831
leptopoda, Hk. f. & T.	•••	"	94	gracile, Brongn	. ,,	331
Lonicera, Linn	•	iii.	9		,,	331
acuminata, Wall		"	10	Lehmanni, Nees		3 3 L
alpigena, Lins		"	15	multiflorum, Stend		381
angustifolia, Wall		,,	13	Lophicarpus yuayanensi	g. <i>"</i>	
asperifolia, Hk. f. & T.		"	11	Mich	. vi.	561
bracteata, Royle			11	Lophocolea, Rohb	v ii	
		"	16			309
	•••	,,	-16	phleoides, Rchb		
confusa, Royle	•••	"		Lopholepis, Dene	∀ i i .	
confusa, DC	•••	"	16	ornithocephala, Steud.		98
decipiens, Hk. f. & T.	•••	"	14		i.	614
depressa, Royle	•••	,,	13	celastroides, Laws	. ,,	615
discolor, Lindl		,,	15	dubium, Laws	,,	61 6
diversifolia, Wall		,,,	14	filiforme, Laws	. ,,	616
allintica. Royle	•••	"	14	6 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	. ,,	615
Finlaysoniana, Wall.			16	0 11 1 777 14		616
glabrata, Wall		"	10			608
	•••	"	ii		"	615
glauca, Hk. f. & T	₩	"		javanum, Turcz	,	
glaucophylla, Hk. f. &	Ι.	"	16	1	. ,,	608
Govaniana, Wall	•••	**	15	ovatum, Presl	. ,,	615
gracilis, Kura	• • • •	"	16	pallidum, Laws	. ,,	615
heterophylla, Dene.	•••	,,	15	reflexum, Laws		616
hispida, Pall		,,	11	Wallichii, Kurz	. ,,	615
hypoleuca, Dene		"	14	Wightianum, Arn		615
japonica, Linn		"	10	Lophophyllum, Griff	•	105
japonica, Wall			10		i. 105	
		"	14		vii.	
lanceolata, Wall	•••	"	10	1 17' 11' TTI A		140
Leachenaultii, Wall.	•••	"	12		•• ,,	
ligustrina, Wall	•••	"	16	Wall	. ,,	149
longifolia, Royle		••		sp., Wall		149

	1	Vol.	Page	Loranthus		V ol.	Page
Lophopyxis, Hk. f	•••	₹.	476	graciliflorus, Wall	•••	₹.	209
Maingayi, $Hk.f.$	•••	,,	476	heteranthus, Wall	•••	,,	208
Lophostylis javanica, Miq.	•••	i.	208	hexapetalus, Ham	•••	,,	204
LOBANTHACEÆ		▼.	203	Heyneanus, Schult	•••	,,	213
Loranthus, Linn	•••	V.	203	Heyneanus, Wall	•••	,,	209
albidus, Bl		"	222	Heynii, DC	•••	,,	209
amplexicaulis, Wall.	•••	,,	215	Hookerianus, W. & A.	•••	"	207
amplewifolius, DC	•••	,,	215	hypoglaucus, Kurz	•••	"	220
ampullaceus, Roxb.	•••	,,	220	imbricatus, Edgew.	•••	"	215
ampullaceus, Wall	•••	"	221	intermedius, Wight	•••	",	205
Arnottianus, Korth.	•••	,,	22 2	involucratus, Roxb.	•••	"	218
· Arnottianus, Wight	•••	,,	207	Kanneli, Schult	•••	,,	223
exanthus, Korth	•••	"	204	Koenigianus, Agardh	•••	"	215
bicolor, Roxb	•••	"	215	lævigatus, Wall	•••	,,	209
biflorus, Desr	•••	"	222	lageniferus, Wight	•••	"	218
Blumeanus, Wight	•••	"	205	Lambertianus, Schult.	•••	,,	223
bracteatus, Heyne	•••	"	213	leptanthus, DC	• •,•	"	211
bracteatus, DC	•••	"	212	leptanthus, Wall	•••	"	211
Brandisianus, Kurz	•••	"	219	leucosiphon, Griff	•••	"	22 2 214
buddleioides, Desr	•••	,,	209	Pligulatus, Thw	•••	"	
buddleioides, Thw	•••	"	209	ligustrinus, Wall	• • •	"	207 208
Candolleanus, Hoh.	•••	"	213	ligustrinus, Hk. f. & T.	•••	"	215
Candolleanus, W. & A.	•••	"	214	lineatus, Edgew	•••	"	204
	•••	"	221	Lobbii, Hk. f	•••	"	214
carinatulus, Wall	•••	"	220	lobeliæflorus, DC	•••	"	215
	•••	"	211	lonchiphyllus, Thw.	•••	"	214
	•••	"	217 209	longiflorus, Desr	•••	"	221 221
9 alamata Dank	•••	٠,		loniceroides, Linn	•••	"	221
	•••	"	212 212	macrophyllus, Zenk.	•••	"	222
77	•••	"	206	, , , , , , ,	•••	"	210
an and a second TT and a	•••	"	205	memecylifolius, W. &		"	217
	•••	"	209	2011-1-722 307-11		"	223
	•••	"	216	4. 1071.3.4	•••	"	214
a 210 - 11 377 - 11	•••	"	209		Ä.	"	216
and a succe Dage	•••	"	222		•••	"	204
C		"	212		•••	"	223
ana anun 177. C		"	217	.7	•••	"	209
		"	214	1 / / XXY - 11	•••	"	209
4 777 11	•••	"	210	obtusatus, Wall		,,	205
		,,	216	- 3 t TET-11	•••	,,	204
-1-4 72.7		"	212		•••	"	221
-1 TIT-11	•••	"	215	oleoides, DC	•••	"	22 0
eleutheropetalus, Kurz		"	208		•••	,,	210
ensifolius, Thw		,,	206	pallens, Wall	•••	**	220
erythrostachyus, Wall.	v. 2	06,	223	Parishii, Hk. f	•••	,,,	205
Euphorbiæ, Wight	•••	₹.	216	pentandrus, Linn		216,	
falcatus, Linn. f			215		" 2	206,	
		,,	216		•••	▼.	206
	•••	••	210		•••	"	205
	••	"	216		•••	**	222
		,,	222		•••	"	205
	••	••	220		•••	"	211
? fuscus, Bl	•••		210		•••	99	223
	••		218		•••	"	209
Richorn's Trongo		,,	220		<u></u>	"	206
goodeniæflorus, DC	•••	"	214	recurvus, Wall	₹, 2	218,	423

Loranthus	Vol.	Page	Loures		Pag
	▼.	209		ii.	15
retusus, Jack	,,	219		. ,,	15
	,,	217		Vi.	263
	,,	210	• longiflora, Scort	,,	264
	,,	216	Loxanthus Gomezii, Nees i	r. 511	, 514
rufidulus, Wall	.,,	209		., i v.	352
rugulosus, Heyne	,,	223		,,	352
sarcophyllus, Wall	,,	217	Loxococous, H. Wendl. S. D.	r. v i.	413
Schultesii, Bl	,,	210	rupicola, H. Wendl. & D	r. "	418
sclerophyllus, Thw	,,	214	Lovonia? alata, Wall	iv.	352
Scurrula, Linn	,,	208	P decurrens, Bl	,,	370
Scurrula, DC	. ,,	209	Loxostemon, Ilk. f. & T.		139
serrulatus, Roxb	. ,,	223	pulchellus, Hk. f. & T	., ,,	139
siamensis, Kurz	. ,,	223	Loxostigma, Clarke		344
speciosus, Wall	. ,,	205	Griffithii, Clarke	. ,,	344
sphærocarpus, Bl	. ,,	221	Loxotis intermedia, Benth.	iv.	367
sphenoid us, Bl	,,	209	obliqua, Benth	,,	367
Stocksii, Hk. f	. ,,	213	1	,,	367
subglobosus, Wall	. ,,	220	Lucaa ciliata, Steud	vii.	146
suborbicularis, Thuc	,,	214	gracilis, Kunth	,,	146
terrestris, Hk. f	,,	207	Langsdorffiana, Steud		146
terrestris, Heyne	. ,,	205	major, Steud		146
tetrandrus, Heyne	. ,,	205	plumbea, Steud		146
thelocarpus, Hk. f	. ,,	211	Schimperi, Steud		147
tomentosus, Heyne	. ,,	212	violacea, Steud		146
tomentosus, Wight	,,	213	Lucinæa, DC		93
trigonus, W. FA	. ,,	219	Morinda, DC	. ,,	93
turbinatus, DC	,,	223	Luculia, Sweet		36
umbellatus, Heyne	. ,,	221	gratissima, Sweet	. ,,	36
umbellatus, Wall	. ,,	211	gratissima, Wall		37
umbellifer, Schultz	٠,,	211	Pinceana, Hook	. ,,	37
umbellifer, Brand	. ,,	212	Ludia fætida, Roxb. i. 19	92, ii.	598
vestitus, Wall	. ,,	212	spinosa, Roxb	. i.	190
viridiflorus, Wall	٠ ,,	221	Ludisia discolor, Lindl	. vi.	101
viscifolius? Wight	. ,,	223	Ludolfia glaucescens, Willd.		391
Wallichianus, Schultz	٠,,	204	Ludwigia, Linn	. ii.	588
Wightianus, Wall	٠,,	215	diffusa, Ham	. ,,	588
Wightii, Hk. f	٠,,	207	fruticulosa, Bl		588
sp., Hk. f. & T. v. 209, 211	l , 2 13,	222	jussiæoides, Wall		588
Loropetalum, Br		428	lythroides, Bl		588
chinense, Oliv	. ,,	428	parviflora, Roxb.		588
Lотеж	. ii.	57	prostrata, Roxb	•	58 8
Lotonionis, DC	. ii.	64	Luffa, Cav		614
Leobordes, Benth	. ,,	64	acutangula, Rozb	. ,,	615
Lotus, Linn		91	acutangula, W. & A		614
bracteatus, Wall	. ,,	91	ægyptiaca, Mill		614
corniculatus, Linn	. ,,	91	amara, Roxb		615
? Garcini, DC		91	amara, Wall	. ,,	618
indicus, Desv		63	Bendaul (Bindaal), Roxb.	,,	615
major, Scop		91	Cattu-picinna, Ser		614
Stocksii, Boiss		91	clavata, Roxb		614
	. vii.	272	cylindrica, Roem		614
Loures, Neck	••	154	echinata, Roxb		615
campanulata, Benth		155	Goza, Wall		614
microphylla, Wall		154	graveolens, $Roxb$	•	614
obcordata, Desv		154	hederacea, Wall		614
	. ,,	154	Kleiuii, W. & A		616

Luffa	v	ol.	Page	Luzula		Vol.	Page
2 1 1 71 73 3		ii.	615	effusa, Buchen		vi.	401
7 977 11		,,	614	Forsteri, Hk. f. & T.		, 11	401
4 7 D. 1.		"	614	pilosa, Willd		,,,	401
D (1 C)		"	6140		•••	,,	401
701 1 1 700		••	615	spicata, DC	•••	,,	401
n t		••	614	Lyama, Roxb			669
O-4		"	614	Lychnis, Linn		i.	222
tuberosa, Roxb		,.	618	apetala, Linn		,,	222
1 11 ID		,,	616	brachypetala, Hort. Be		"	223
	vi.		178	cachemeriana, Royle	•••	,,	224
1 . 7 . 31		ri.	53	cancellata, Jacq		"	226
		11	25	ciliata, Wall		"	225
2 / 2 . A		"	26	coronaria, Lumk		"	222
		,,	24	cuneifolis, Royle	•••	"	226
T. 1		,,	23	eriostemon, Wall	••	,,	225
2		"	22	Falconers, Rohrb		"	223
0110 7-1 A		,,	23	fimbriata, Wall		,,	225
O: 10. A			25	himalayensis, Edgew.			223
		"	24	indica, Benth		**	225
		"	23	inflata, Wall		"	225
		**	25	macrorhiza, Royle		"	223
1 1 7 73 11 8		**	22	madens, Jacquem		"	223
primulina, Par. & Rehb.	f	"	24	multicaulie, Wall		,,	224
n n.ll f		"	24	nigrescens, Edgew	•••	"	223
and an Dakk A		"	23		• • • •	"	225
A 10 - 11 - D1		"	24	14. 1	•••	,,	224
4 440 11 77 2		"	22	., ., .	•••	"	226
		"	23	7 7	•••	"	226
		"	23		•••	"	224
		"	23	Stewartii, Edgew	• • •	,,	223
		,,	25 25	tristis, Hk. f. & T	•••	?"	213
		,,		LYCHNIDEE	•••	i.	240
		"	44 25	Lycium, Linn	•••	įv.	241
		,,	22	arabicum, Schweinf.	•••	"	241
		"	22 24	armatum, Griff	•••	"	241
zeylanica, Thw		"		barbarum, Linn	•••	"	241
		ii.	451	depressum, Stocks	•••	"	241
		"	452 452	Edgeworthii, Dunal	•••	"	240
		"		europæum, Linn	• • •	"	241
		"	452	foliosum, Stocks	•••	"	241
		"	452	glaucum, Miers	•••	"	
	1	▼.	610	indicum, Wight	•••	"	240 241
		"	611	intricatum, Boiss	• • • •	"	
		"	656	mediterraneum, Dunal	•••	**	240
		"	610	orientale, Miers	•••	"	240
		"	615	persicum, Miers	•••	27	240
		,,,	615	ruthenicum, Murray	•••	,,	241
Lupinus cochinchinensis, Lo		u.	75	sævum, Mieri	•••	"	240
	•••	97	92	tataricum, Pall	•••	23	241
77.		"	82	turcomannicum, Turcz.		."	241
and the second s		ì.	508	Lycopersicum, Miller	•••	ì₹.	237
	•••	"	509	cerasiforme, Dunal	•••	-99	237
	•••	,,	509	esculentum, Miller	•••	,"	237
	•••	"	509	. Lycopsis, Linn	•••	ì♥.	168
	•••	"	509	arvensis, Linn	•••	"	168
		"	509	pulla, Linn	•••	,,,,	169
		٧i.	401	Lycopus, Tourn	•••	i▼.	648
campestris, DC	•	,,	401	dianthera, Ham	• • •	"	647

				•
Lycopus		Vol.	Page	Maba Vol. Page
	•••		648	acuminata, Hiern iii. 550
			648	andamanica, Kurz ,, 551
	•••	٧.	194	hamifalia Dana 651
Lygia Passerina, Fasan.	•••	_ `	39 .	
	•••	i▼.		,
angustifolia, $Hk. f$	•••	11	39	
Lysimachia, Linn	:	iii.	501	guineensis, A. DC ,, 551
		,,	502	littorea, Br ,, 551
-1-4- (14		92	504	madagascariensis, A. DC. , 551
altermifolia Wall			504	Maingayi, Hiern ,, 552
<i>3:3</i> - T <i>2</i> 31	• • •	"	502	
	• • •	"	503	
	•••	"		, 1100.00
	•••	,,	502	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	•••	,,	502	
debilis, Wall		,,	505	oblongifolia, Hiern ,, 550
decurrens, Hance		,,	502	ovalifolia, Hiern ,, 551
delinides Wills		,,	505	Smeathmanni, A. DC ,, 551
1-i- W-11			504	sp., Wall ,, 551
A		"	505	Macaranga, Thouars v. 445
Francis and Market	•••	"	504	1
	•••	"		D
	•••	,,	504	Curtisii. Hk. f
		"	503	1 0 000 0 000000 1 1 1 1 1 1 1 1 1 1 1
glaucescens, Wall		,,	502	denticulata, Muell ,, 446
heterophylla, D. Don		,,	503	depressa, Muell , 454
iomonico Minut		,,	50 5	digyna, Muell ,, 453
Zamandan Mila			505	flexuosa, Wight ,, 446
inmanian Di		"	502	Gamblei, Hk. f ,, 445
Longhamanisti Duku	•••	"	501	gigantea, Muell ,, 449
limaamidalia Caiff	•••	"		
	•••	"	504	G 100.11 37 17 459
	•••	"	502	
	•••	,,	505	gummiflora, Muell ,, 446
multiflora, Wall		,,	502	Helferi, Muell ,, 459
37.4 137 13		,,	502	Hosei, King ,, 449
alamaka ITuu	•••	,,	502	Hullettii, King ,, 452
1 1			504	hypoleuca, Muell ,, 448
mmaliform Winds		"	503	indica, Wight v. 424, 446
3.1 107 17	• • •	"	503	involucrata, Muell v. 454
	•••	"		javanica, Muell v. 451, 454
	•••	"	504	
	٠,٠	,,	503	
secunda, Ham		"	502	Lowii, King ,, 453
tenella, Wall		,,	506	Maingayi, Hk . f , 449
tetragona, D. Don		"	504	megalophylla, Muell ,, 449
		"	505	membranacea, Kurz, ,, 454
T		iii.	482	minutifiora, Muell ,, 450
		iv.	343	molliuscula, Kurz ,, 417
conforts Clarks			344	perakensis, Hk. f ,, 447
	•••	"	344	1 1.0 1. 36 11 480
	•••	"		populational 12 worth 111 111 11
	•••	"	344	publication,
Lysistemma dendigulense,St	eet:	z 111.	238	
divergens, Stootz	•••	"	234	rugosa, Muell ,, 449
		"	234	Tanarius, Muell ,, 447
	•••	"	239	tomentosa, Wight ,, 448
	•••	ű.	565	trichocarpa, Muell ,, 450
		ii.	565	triloba, Muell ,, 452
			572	Wightiana, Baill ,, 448
Lythrum fruticosum, Lin		ii.		77 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Pemphis, Linn. f	•••	"	573	
				Macclellandia Griffithiana,
Maba, J. & G. Forst	•••	ııı.	550	Wight ii. 573
•				

	Vol	Page	1 7	ol. Page
Machærina, Vahl	vi.			i. 738
41 12 37 . 1 1		~~ 4	4 i	799
macharisia icosandra, Planch	. "		77-4 362-	797
	136,			" 798
	▼.			" 700
bootanica, Meissn v	. 138	881	Macrophthalma elastica,	,, 700
Clarkeana, King ,	137	860	1 ~-	v. 508
Clarkeana, King ,,	₹.	961	ne	
Duthiei, King	. 1 3 8,	901	7 .7 35.	001
				221
fruticosa, Kurz ,,	140,	901		" 220 219
Gamblei, King ,,	138	, 860	retusus, Miq	
Gammieana, King ,, glaucescens, Wight	137,	860		,, 221
glaucescens, Wight	V.		Macrostigma tupistroides,	
incrassata, Nees	,,	126		i. 325
indica. Knrz	,,	139	Macrostomium aloefolium, Bl.	v . 723
? khasyana, Meissn. v.	137,	861	Macrostylis disticha, Breda	ri. 91
	₹.		Macrotomia, DC i Benthami, DC	
Kurzii, King		860	Benthami, DC	,, 177
Listeri, King v.	138,	860		,, 177
macrantha, Nees ,,	140,	861		,, 177
odoratissima, Nees ,,	139,	859	onosmoides, Regel & Smir-	,,
odoratissima, Wall	,⊽.	861		. 177
parviflora, Meissn v.	137,	860	manamaia Daisa	7 177
pai vinoi a, meissii v.	107,	144	Magnetuspie hangana Mic	
	V.			OFO
pubescens, Bl		862		,, 200
	139,		Madacarpus belgaumensis,	040
serioea, Bl ,,	139,			ii. 34 8
	₹.		Madaractis arachnoidea,	
	140,		Hb. Calo ii	
sp	v.	862	glabra, DC lanuginosa, Edgew	, 344
Mackaya populifolia, Arn.		578	lanuginosa, Edgew	, 846
Mackenziea sessilis, Nees	i▼.	474	Metziana, Schultz	,, 344
Macklottia amboinensis,			pinnatifida, DC	, 345
Korth	ii.	464		,, 344
javanica, Korth	,,	464	scabra DC.	, 345
Maclura amboinensis, Bl	Ÿ.	538		í. 317
javanica, Bl	,,	538	1: D1. £ 0. //	, 318
javanica, Miq		538	modicallate #1/2 f	912
timorensis, Bl	"	538		. 171
Macraea Gardneriana, Wight	".	296	anamania Wh f h T	171
myrtifolia, Wight		296	allam sifalia A Diah	171
7 7	"	295	analifalia Camb	171
116 11 127 17	"	296	sauhus Camb	" 171
TO 122 3177 1 4	"		36 73	·
	. ??	296	and the state of t	END
Macreightia acuminata, Thw.	111.	550		511
andamanica, Kurz	"	551	acuminata, Wall ,	
oblongifolia, Kurz	,,	551		, 508
oblongifolia, Thw	"	550		, 510
ovalifolia, Thw	"	551		, 510
Macrocapnos scandens, Royle	i.	121		, 509
Macrocladus sylvicola, Griff.	₹i.	423		, 508
Macrocnemum strictum,			dioica, A. DC ,	, 509
Willd	iii.	121	dubia, Wall ,	, 510
Macrolinum trigynum, Rchb.	i.	412	full line annual A DC	, 510
Macrolobium bijugum, Coleb.	ii.	275	glabra, A. DC ,	EVO
Macrolomia bracteata, Nees		694	. 32 - TIT 17	, 509
Macronyx strigosus, Dalz			lanceolata, G. Don ,	EAR
	-		•	-

V	** .	~	Malaria	17-1	Da
Mana A DC		Page 509	Malaxis decurrens, Bl	. VOI.	Page 706
·	iii.	510			680
macrophylla, Wall	"	508	l		706
missionis, A. DC	,,	510			679
mollis, A. DC			ensiformis, Sm		681
mollissima, Kurz	"	510	forcipata, Rchb. f		676
mollissima, Wall		510		. ,,	675
montana, A. DC		509	iridifolia, Rchb. f		676
muscosa, Kurz	"	511	Jenkinsiana, Rohb. f		698
ovata, A. DC	"	508		•• •;	182
paniculata, A. DU		509	latifolia, Bl		690
permollis, Kurz	"	510	latifolia, Sm		682
Perrottetiana, A. DC		509	Lindleyana, Rohb. f.		679
pyrifolia, Miq	"	509	longebracteata, Rohb. f		
ramentacea, A. DC	,,	508		₹i.	180
rugosa, Clarke	",	508		v.	685
sumatrana, Schoff	"	508		. ,,	706
tomentosy D. Don	,,	510		. ,,	685
verrucosa, Kurz	,,	508		. ,,	680
virgata, A. DC	. "	509	nervosa, Sw nutans, Willd	. Vi.	182
Mæseæ	iii.	507	nutans, Willd	. ,,	16
Magnolia, Linn		41		▼.	684
Campbellii, Hk , f . f T	,,	4 L		,,	698
excelsa, Wall globosa, Hk. f. & T		43		,,	682
globosa, Hk. f. & T	,,	41		,,	690
(xrimidil, xik. j. q i		41		. ,,	678
insignis, Wall		42	recurva, Rchb. f	,,	680
punduana, Wall		43	Rheedir, Heyne	,,	690
sphenocarpa (error for			Rheedii, Sw	,,	688
pterocarpa), Roxb	,,,	41	1 61 7 13 -1 1 6	,,	683
MAGNOLIACEA		38	Scylla, Robb. f	,,	685
MAGNOLIEÆ	i.	39	setifera, Rchb. f	,,	680
Maharanga bicolor, A. DC.		179		,,	680
Emodi, A. DC		170	tenuis, Rchb. f	,,	682
Wallichiana, A. DC		179		,,	677
Mahonia nepalensis, DC		109		,,	678
Mahwah or Mudhuea, Ham.	iii.	544	viridiflora, Bl	,,	70 1
Maingaya, Oliv	ii.	428	Wightiana, Robb. f.	,,	683
malayana, Oliv		428	Malcolmia, Br	i.	146
Malachium aquaticum, Fries		229	africana, Br	,,	146
Malachra, Linn		329	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,,	146
capitata, Linn		329	1	,,	149
Malacochæte littoralis, Nees	vi.	659	1 . '	. , , , .	146
pectinata, Nees		659	torulosa, Boss	,,	146
? Malaisia tortuosa, Kurz	. ₩.	490	Mallea integerrima, Wall.		545
Malaspinæa laurifolia, Presi		5 3 3	Rothii, Juss	,,	545
Malaxis acuminata, D. Don	٧.	686	subscandens, Teysm. &	. "	
		685		,,	545
anceps, Robb. f angustifolia, Robb. f	• • •	684		iii.	591
anthropophora, Rehb. f	-	684		v.	427
		682		,,	431
brachystachys, Rohb. f		677		,,	431
70 70 11 4		€81		·· ,,	429
caulescens, Rohb. f		683	1 110 1 30 - 31	,,	432
cernua, Willd	٠.,		1	,,	439
cimicing Robb f		676	1	,,	436
cimicina, Rohb. f		706	1 4 1 10 11	,,	424
compressa, Bl cordifolia, Sm		69 3		,,	440
cordifolia, Sm	"		1 2000 10000000000000000000000000000000	,,	

Mallotus		Vol.	Page	Vol. F	'age
aureo-punctatus, M		٧.	438	Malva, Linn j.	320
	•••		428	alchemillæfolia, Wall "	320
Beddomei, Hk. f.	•••	. ,,	438		320
Beddomei, Hk. f. bracteatus, Hk. f. P Caput-Medusæ, H			436	ciliata, Wall ,,	320
? Caput-Medusæ, H	Ok. f.	"	443	malwensis, Edgew ,,	319
Clellandii, Hk. f.			435	mauritiana, DC ,,	3 2 0
cochinchinensis, 1	Lour.	"	430		320
	•••	"	434		321
31.4 37 11		"	441	parvifora, Huds ,,	320
eriocarpoides, Muel	•	"	434	rotundifolia, Linn ,,	320
eriocarpus, Muell.		"	432	1'6 l'a Dank	320
filiformia Hb f	•••	,,	435	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	320
fili formis, Hk. f. floribundus, Muell.	•••	"	432	7.	321
fuscescens, Mueli.		,,	441	Automobile Ada	321
Griffithianus, Hk. f	,	"	433	7.	320
A *** 1A . *** 11		"	431	1 1 1 1	320
	••• •••	"	438		317
	•••	"	439		321
Kingii, Hk.f ? Kunstleri, King		"	443	A C	321
Kurzii, Hk. f		"	427	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	321
	•••	"	434	,	345
lancifolius, Hk.f. lappaceus, Muell.	•••	"	425	and the first of t	318
W 10 We 11	•••	,,	438	22221212	259
	···	"			507
leptostachyus, Hk.		"	435	1	270
leucodermis, Hk. f.		17	441	10.09.700.00, 2.10.00.00	271
		"	426		186
macrostachyus, Ma		"	429		
micranthus, Muell.		"	440		241 242
moluccanus, Linn.			444		
muricatus, Bedd.			, 438	1	242
muricatus, Kurz	•••	v.	439	Mangifera, Linn 11.	13
muricatus, Muell.		"	437	axillaris, Lamk ,,	23
nepalensis, Muell.		"	428	cmsis, Jack ,,	19
nitidus, Muell.	• • • • • • • • • • • • • • • • • • • •	,,	444	caloneura, Kurz ,,	14
oreophilus, Muell.		."_	429	domestica, Gærtn ,,	14
paniculatus, Muell.			, 430	foetide, Lour ,,	18
penangensis, Muell		▼.	440	fætida, Bl "	19
philippinensis, Muc		"	442	fætida, Mig ii. 17	
polyneurus, Hk. f.		"	439	fragrans, Maingay ii.	18
Porterianus, Muell.		,,	432	3.0	623
puberulus, Hk . f .		"	435	gracilipes, Hk. f ii.	16
repandus, Muell.		"	442	Griffithii, Hk. f ,,	14
rhamnifolius, Muei		"	440	Horefieldii, Miq ,.	19
ricincides, Muell.		"	480	indica, Linn ,,	13
Roxburghianus, Ma		"	428	indica, Thw ,,	16
stenanthus, Muell.		"	437	indica, Wall ,,	15
subpeltatus, Muell.		0, ▼.		$\textbf{lagenifera}, \textit{Griff}. \dots ,,$	18
tetracoccus, Kurz		▼.	429	longipes, Griff ,, macrocarpa, Bl ,,	15
? vernicosus, Hk. f.	•••	"	443	macrocarpa, Bl "	18
	<u></u>	,,	487	Maingayi, Hk.f ,,	17
Wallichianus, Mue		;,	434	microphylla, Griff ,,	17
Wrayi, King		"	483	oblongifolia, Hk. f ,,	16
zeylanicus, Muell.		"	440	odorata, Griff ,,	17
MALPIGHIACEÆ		i.	417	oppositifolia, Roxb ,,	21
Malus baccata, Desv.	•••	ii.	373	Parih, Miq ,, pentandra, Hk. f ,,	18
communis, Desv.		**	87 3		14
Sieversii, Ledeb.		"	379	pinnata, Koen ,,	42

Mangifera		Page	Mappa Vol. Page
policarpa, Griff	ii.	20	? peltata, Wight v. 449
quadrifida, Jack	"	16	populifolia, Muell ,, 451
sclerophylla, Hk. f	"	15	rugosa, Muell ,, 449
superba, Hk . f	77	19	• Tanaria, Spreng ,, 447
sylvatica, Roxb	,,	15	Tanarius, Bl ,, 447
zeylanica, Hk. f	"	16	tomentosa, Bl ,, 447
Manglietia, Bl	i.	42	trichocarpa, Rchb. & Zoll, 450
Candollei, Wall	,,	41	triloba, Maell ,, 152
Caveana, Hk. f. & T	,,	42	truncata, Muell ,, 446
insignis, Bl		42	Wallichii, Baill ,, 446
Manihot utilissima, Pohl	", V.	239	7:
Manisuris, Sw	vii.	159	Zallimani Min 150
		159	75 700
	"	159	(I) Winn 500
hirta, Russ	,,	154	
Myurus, Linn	"	159	1 1000000, 220000 100 100 100 100
polystachya, Beauv	"		
porifera, Hack	??	160	Gardneriana, Miers , 589 oblonga, Miers i. 589, iv. 140
Manna hebraica, D. Don	ii.	145	oblonga, Diters 1. 559, 14. 140
nepalensis, D. Don	"	145	ovata, Miers 1. 589
Mantisia, Sims	٧i.	200	ovata, Miers iv. 144
saltatoria, Sims	,,	200	tomentoss, Miers i. 589
spathulata, Schult	,,	201	Wightiana, Miers " 589
MANULEE iv.	247,	, 258	Maranta caespitosa, A. Dietr. vi. 259
Manungala pendula, Blanc.	i.	519	dichotoma, Wall ,, 258
Maoutia, Wedd	٧.	592	Galanga, Linn 253
Puya, Wedd	,,	592	grandis, Miq ,, 258
Mapania, Aubl		680	imbricata, A. Dietr ,, 259
andamanica, Clarke		6 81	malaccensis, Burm ,, 255
bancans, Benth. & Hk. f.	,,	680	parviflora, A. Dietr " 259
humilis, Nav. & Vill		683	Placentaria, A. Dietr ,, 259
hypolytroides, Benth	"	680	ramosissima, Wall ,, 258
		682	960
immersa, Benth		681) product, 22211
Kurzii, Clarke		683	, , , , , , , , , , , , , , , , , , , ,
longa, Clarke		683	MARANTEE vi. 200 Maranthes multiflora, Korth. ii. 310
lucida, N. E. Br			
multispicata, Clarke		682	Margarocarpus vimineus, Wedd v. 581
palustris, Benth	,,	681	
Pandanophyllum, Sch. &		200	Margarospermum arvense,
Hollr	11	680	20201 111 111 111
silhetensis, Clarke	* **	681	officinale, Done ,, 175
tenuiscapa, Clarke	,,,	683	Marisous, Vahl vi. 619
Wallichii, Clarke	,,	682	albescens, Gaud ,, 623
zeylanica, Benth	,,,	682	biglumis, Gaertn ,, 622
Mappa acuminatissima, Zipp	. v.		bulbosus, Clarke ,, 620
bancana, Miq	,,,	451	capitatus, Zoll ,, 677
cochinchinensis, Spreng	•	430	corymbosus, Boeck ,, 622
denticulata, Miq	,,	446	cyperinus, Vahl ,, 621
digyna, Muell	,,	453	cyperinus, Nees vi. 621, 622
floribunda, Zoll. & Mor	, ,,	432	cyperoides, Dietr vi. 625
glabra, A. Juss	"	447	dilutus, Nees ,, 624
gummifua (gummiflora),	, ,,		Dregeanus, Kunth , 620
		446	ferax, Clarke ,, 624
? hypoleuca, Rohb. & Zoll.	***	448	giganteus, Boeck ,, 624
javanica, Bl		451	Hookerianus, Clarke ,, 628
megalophylla, Muell	,,	449	inneredus Noon 890
meyacophysia, Bluen	, ,,	147	
moluccana, Wight paniculata, Wall	"	446	Lullius informais Decele Cor
Paniculata, Wall	, ,,	770	kyllingiæjorinis, boeck ,, oze

Mariscus	V ol.	Page	Marumia	٧	ol. Page
microcephalus, Presl		624	affinis, Korth		ii. 5 42
paniceus, Vahl	,,	620			,, 542
paniceus, Strach		622	nemorosa, Bl		,, 542
pictus, Nees		621	7 37 3		,, 542
pictus, Nees		620	D1		" 542
pictus, Nees Pullu, Steud		621	1 37 7 1 TP 13.		" 54 2
Sieberianus, Nees		622	1. * 717		,, 54 2
squarrosus, Clarke		623	~~		ii. 312
sundaicus, Miq		621			,, 316
tenuifolius, Schrad	, .	622			ii. 195
umbellatus, Moritz		621	1 1 1 1 1		,, 195
umbellatus, Vahl	' ''	622			i. 745
Wallichianus, Kunth		621	, 0, 7		,, 745
sp., Wall. vi. 618, 620, 621					", 746
Markhamia stipulata, Seem.		379			716
Marlea, Roxb	• •	742			746
- AP 10		7+3			746
L L - A		743			" 7AR
		743			" 715
begoniæfolin, Kaxb		-			" 740
ebenacea, Clarke		742			
Griffithii, Clarke		742	Mastostigma varians, Stock		
hetcrophylla	"	744		₹	
macrophylla, Sieb. & Zucc	,,,	744		1	ii. 315
nobilis, Clarke	,,,	743		•••	,, 317
tomentosa, Endl	,,	743		• • •	,, 315
sp., Hk. f. & T	,,	744	oleracea, Ham		,, 314
Marmoritis rotundifolia,				• • •	,, 316
Benth		662	suaveolens, Linu		,, 315
Marrubium, Linn	iv.	6 7 1	Matthæa, Bl		v. 115
indicum, Burm	,,	672			,, 115
lanatum, Benth		671	Matthiola, Br		i. 130
lanatum, Benth Malcolmii, Dalz		650	Matthiola, Br incana, Br		,, 131
mollissimum, D. Don		681			,, 131
odoratissimum, Burm		672			,, 131
propinguum, Benth		671	Mattia himalayensis, Klot		v. 162
vulgare, Linn		671	Mayodendron, Kurz	i	v. 381
Marsdenia, Br ,	• ' '	34			,, 382
angustifolia, Wight		39			ii. 102
Brunoniana, W. S. A		36		_	v. 259
Calesiana, Wight		37			" 259
		35	dentatus, Wall		,, 260
eriocarpa, Hk . f Griffithii, Hk . f		36			" 288
Hamiltonii, Wight	• • •	36			950
Jenkinsii Hk f	"	36	<u> </u>		ິ ໑໔∩
Jenkinsii, Hk. f lucida, Edgew		36			" asa
		37	- · · · · · · · · · · · · · · · · · · ·		i. 118
monostachua Wall		34		•••	110
monostachya, Wall		37			" 110
rotundifolia, Done	.,	111	GulWaldemarii, Klot		" 110
Roylei, Wight		35 25	-!!!- 100		, 118
tenacissima, W. & A		35 27	nipalensis, DC		, 118
thyrsiflora, Hk. f		37		m	, 118
tinctoria, Br tinctoria, Hk. f. & T	"	34		T.	, 118
tinctoria, Hk. f. & T		37	Wallichii, Hook		,, 119
	iv.			i	ii. 1 6 0
	. i v .		nidulans, Benn		,, 160
	356,				vi. 301
Marumia, Bl	ii.	541	Medicago, Linn	:	ii. 8 9

- -			•
Medicago	Vol.	Page	Melaleuca Vol. Page
canescens, Grab	ii.	90	minor, Sm ii. 465
denticulata, Willd	"	90	saliyna, Bl ,, 465
falcata, Linn	,,	90	viridiflora, Gærtn ,, 465
laciniata, All	,,	90	Melampyrum, Linn iv. 318
lupulina, Linn	,,	90	• indicum, Hb. f. S T , 318
minima, Lamk	"	91	Melandryum apetalum, Rohrb. i. 222
aubiamlamia 411		90	bus also at a farm Donal 994
	"	90	Eletaniani Dabah 999
	"	90	Chaiffeld Dobah 990
The state of the same	,,	90	indiction Dobob 995
sativa, Linn	"	90	
sativa, Wall	??		D-1-1 000
Medinilla, Gaud	ii.	546	macrorhizum, Rohrb ,, 223
Beddomei, Clarke	"	518	multicaule, Rohrb ,, 224
crassifolia, Bl	"	547	nutans, Rohrb i. 225, 226
crassifolia, Triana	"	547	Melanium fruticosum, Spreng. ii. 573
erythrophylla, LdI	"	547	Melanocenchris Jacquemontii,
fuchsicides, Gardn	,,	548	J. & S vii. 284
Griffithii, Clarke	,,	54 9	Perrottetii. J. & S ,, 284
Hasseltii, $Bl.$,,	547	plumosa, J. & S ,, 284
himalayana, $Hk. f.$,,	549	Rothiana, Nees ,, 283
macrocarpa, Bl	"	547	Royleana, Nees ,, 284
maculata, Gardn	"	548	Melanochyla, $Hk. f.$ ii. 38
Maingayi, Clarke	"	549	an anatifalia III. f
malabarica, Bedd		548	ampionlata VI (
• • • • • • • • • • • • • • • • • • • •	"	549	M-: : 111. f
	"	549	111 (
pauciflora, Hk. f	"	548	
radicans, Bedd	"	547	
rosea, Gaud	"		91-1
rubicunda, Bl	"	547	Maingayi, Hk . f , 25
speciosa, Bl	"	549	usitata, Wall ,, 25
? Walkeri, Wight	,,,	526	Wallichii, Hk. f ,, 25
MEDINILLEÆ	ii.	513	sp., Griff: ,, 25
Medora divaricata, Kunth	₹í.	323	Melanoseris bracteata, Hk.f.&T. iii. 409
Medusa anguifera, Lour	· i.	188	lyrata, Done ,, 409
Meesia serrata, Gærtn	i.	525	paniculata, Edgew ,, 408
Megabotrya melixfolia, Hance	i.	490	sazatilis, Edgew ,, 408
Megacarpæa, DC	i.	161	Melanthucea, Griff vi. 356
bifida, Benth	,,	161	Melanthesa chinensis, Bl v. 331
polyandra, Benth		161	obliqua, Wight ,, 329
Megalachne zeylanica, Thw.	vii.	269	reclinata, Muell ,, 331
Megastachya ciliaris, Beauv.	vii.	315	rhamnoides, Wight , 330
7		319	manadain Mia 905
	"	320	tunkingta Wight 290
	**	328	Melanthesopsis fruticosa, Kurz v. 332
? papposa, R. & S	317,	210	
polymorpha, Beauv vii.		904	manishilia Manall 990
Megera, vide Meyera	iii.	304	
Megistostigma, Hk. f	₹.	466	Melanthium caricinum, Roth vi. 357
malaccensis, Hk. f	"	467	hyacinthoides, Herb. Madr. " 348
Meistera, Giseke	vi.	237	indicum, Linn ,, 357
Melaleuca, Linn	ii.	464	nudum, Heyne ,, 348
Cajuputi, Roxb	"	465	racemosum, Roth ,, 357
Cumingiana, Turoz	,,	465	Melastoma, Linn ii. 523
decurrens, Wall	,,	467	annulatum, Wall ,, 546
eugeniifolia, Wall	"	467	anoplanthum, Naud , 523
lancifolia, Turez	,,	465	asperum, Linn ,, 519
Leucadendron, Linn	"	465	P barbatum, Wall ,, 546
Leucadendron, Lam	"	465	lundary Name
A SWALLOW ON JUNE 1	"		oracnyouon, Naud " 025

Melastoma		W-1 '	Do do		ol. Page
		Vol.∶ ii.	543	Melhania, Forsk	i. 372
1 4 4 1999 11	•••		548	abutiloides, Arn	979
n' 1	•••	"	526	1 1 11 11 11 11 11	" 979
	• • •	"	545	abyssinica, A. Rich	279
cernuum, Wall	•••	"	524	humatasa Poine	" 979
crinitum, Naud	•••	"		bracteosa, Boiss	279
crinitum, Roxb	•••	"	517	cannabina, Wight	
curvum, Roxb	•••	"	525	Denhami, Br	,, 373
cyanoides, DC	•••	"	522	futteyporensis, Munro	,, 378
decemfidum, Jack	• • • •	"	524	Hamiltoniana, Wall	,, 372
ellipticum, Naud	•••	,,	525	Hamiltoniana, Munro	,, 378
erythrophyllum, Wall.	•••	,,	547	incana, Heyne	,, 372
exiguum, Jack	•••	,,	527	ovata, Boiss	,, 372
eximium, Bl		,,	549	tomentosa, Stocks	,, 378
fallax, Wall	ii.	544,	545	Melia, Linn	i. 548
fasciculare, Naud		ii.	524	æthiopica, Welw	,, 545
Finlaysonii, Wall		"	525	argentea, Hb. Ham	,, 545
P glaucum, Griff		,,	545	australasica, Juss	,, 545
glaucum, Jack	•••	"	546	Azadirachta, Linn	,, 544
glaucum, Wall		"	545	Azedarach, Linn	,, 544
gracile, Jack	•••		545	baccifera, Roth	" 545
Houtteanum, Naud.		"	524	Bombolo, Welw	" K 1 E
imbricatum, Wall	•••	"	524		" 544
	•••	"	525	4 737711 3	" 54E
langinosum, Bl	•••	"	547		" E 1 E
laurifolium, Wall? littoreum, Wall	•••	"	528	dubia, Cav	. K44
? littoreum, Wall	•••	"		excelsa, Jack	" = 44
longifolium, Naud	•••	"	525	indica, Brandis	
malabathricum, Linn.	•••	"	52 3	Koetjape, Burm	,, 558
malabathricum, Jack	•••	"	524	montano, Hb. Madr	,, 545
microphyllum, Naud.	• • •	"	525	parvijlora, Moon	,, 544
moluccanum, Bl	•••	"	522	penduliflora, Wall	,, 550
napalense, Lodd	•••	"	524	pumila, Moon	,, 543
nemorosum, Jack	••••	"	542	robusta, Roxb	,, 545
normale, D. Don	•••	"	524	sempervirens, Sw	,, 544
? obvolutum, Jack	• • • •	"	528	superba, Roxb	,, 545
ozyphyllum, Benth	•••	,,	528	tomentosa, Roxb	,, 549
pallidum, Jack		"	544	? tomentosa, Kurz	,, 568
petiolare, Wall		"	545		i. 569
polyanthum, $Bl.$	•••	1)	5 23	rugosa, Wall	,, 569
polyanthum, Benth		"	546	singapureana, Wall	,, 555
pulchellum, Roxb	•••	"	518	Wightiana, Wall	,, 559
pulverulentum, Jack		"	550	sp., Griff	,, 560
reflexum, Bl		"	550	MELIACEÆ	i. 540
rhodocarpum, Wall		"	542	MELIANTHEE	i. 669
rotundifolium, Jack		,,	541	Melianthus, Tours	i. 697
Royenii, Bl		"	5 2 5	himalayanus, Wall	,, 698
rubicundum, Jack		547,	550	major, Linn	,, 698
rubiginosum, Wall	•••	ii.	544		vii. 32 9
rugosum, Roxb	•••	,,	525	ciliata, Duthie	,, 329
sanguineum, Sims		"	524	Cupani, Guss	" 329
smilacifolium, Wall.	•••	"	550	diandra, Roxb	,, 332
triflorum, Naud		"	525	digitata, Boxb	,, 290
vagans, Roxb		"	526	gracilis, Aitch. & Hemsl.	,, 331
velutinum, Seem	•••	"	524	Hohenackeri, Boiss	,, 329
Wallichii, DC		"	524	Jacquemontii, Done	,, 829
Melastomacea, Griff		iï.	518	lappacea, Rasp	,, 332
MBLASTOMACEE		ii.	512	latifolia, Roxb	" 6L
Melastomes		ii.	512	micrantha, Boiss. & Heldr.	" 8 30

			•		
Melica	Vol	. Page	Molissa	Vol.	Page
		i. 33 0	umbrosa, Bieb	iv.	
		990		,	
* * * * * * * * * * * * * * * * * * *	,,	: :	Melocalamus, Benth		
	,,	332	compactifiorus, Benth.	,,	409
scaberrima, Hk . f	,,	33 0	Melocanna, Trin	vii.	417
, 10	,,	001	bambusoides, Trin	,,	417
Access of the Deleas		330	gracilis, Kurs		410
	··· <u>"</u>	-		,,	418
	1.		humilis, Kurz	,,	
trijuga, Juss	,,	681	? Kurzii, Munro	,,	393
Melicope, Forst	i.	491	lutescens, Kurz	,,	414
0 17-30 177- /	,,	492	Rheedii, Steud	,,	418
		2, 496	tenuispiculata, Kurz		416
		·		,,	414
	i		virgata, Munro	;,	
Meliee	i	. 54 0	Melochia, Linn	1.	373
Melilotus, Juss	ii	. 89	affinis, Wall	,,	374
11	,,	89	concatenata, Wall	,,	874
		90	corchorifolia, Linn.		874
	,,			*** ,,	
altissima, Wall	,,		corchorifolia, Wall	,,	874
Emodi, Wall	,,	. 88	pauciflora, Wall	,,	874
	,,	. 89		,,	374
24_12 a.s. T man	• • • • • • • • • • • • • • • • • • • •	90	supina, Linn		874
		- 00		•••	322
	,,		truncata, Wall	,,	
macrorhiza, Pers	,,			,,	374
minima, Both	,,	89	velutina, Bedd	,,	374
-42 -212 - TIT: 11 J	,	20	Melodinus, Forst	iii.	6 28
		90			628
parvinora, Desj	٠ ٠,	- 00	bhasianna Ul		629
parviflora, Wall	••• •;			,,	
vulgaris, Willd	,,			,,	629
	ii	. 8	monogynus, Roxb	,,	629
4 D -1-	,	. 4		,,	629
A 14 TEP 7	-			3	78
Amadiana Dada	יי		hinden III. C to T		80
	<u>i</u>			,,	
	11			,,	80
dilleniæfolia, Walp.	,,	. 4	elegans, Hk . f. & T .	,,	82
	••• ,,	-		i. 82, ▼.	113
ferruginea, Sieb. & Zucc.	,,	4	Griffithii, Hk. f. & T.	i.	80
					82
integrifolia, nom. delend	. ,,	4, 5	Kentii, Hk. f. & T	··· ,,	
lanceolata, Bl	,,	7	lanuginosum, Hk. f & 7	ľ• "	79
lancifolia, Hk. f	,,	. 5	latifolium, Dun	,,	79
myriantha, Sieb. & Zucc				,,	80
				m	79
	••• ,,	6			79
	,,			,,	
pungens, Wall pungens, Wall	,,				82
pungens, Wall	,,	. 4	polyanthum, Hk. f. & 2	r. "	81
	,,		prismaticum, Hk. f. &	T.,	81.
11.14.11 337 1			rubiginosum, Hk. f. &	T. ,, \	79
	,,	c			81
	,,		rufinerve, Hk. f. & T. verrucosum, Hk. f. & T	, ,,	
Wallichii, Planch	,,			,,	80
Wightii, Planch	,,	. 4	Wallichii, Hk. f. & T.	,,	81
36 11	iv		Melothria, Linn	ii.	625
~~. ~~.		050	bicirrhosa, Clarke		627
4 n. u.	,,	659	2.74. 2 (10)	11	626
	••• ,,		deltoidea, Thw	,,	
longicaulis, Benth	,,	651	fætida, Lamk	••• ,,	627
maxima, Arduin	,,	010	indica, Lour	,,	626
7 7 7	,,	GA7	odorata, Hk. f. & T.	,,	626
		AE1		•••	626
	,,	651			
	,,,		Wallichii, Clarke	*** "	626
repens, Benth	,,	651	zeylanica, Clarke	,,	626

•						
		Page	Memecylon	•		Page
Melothria (Melothria) zey		220	macrophyllum, Thw.	• • •	ii.	559
lanica, Koen		662	Maingayi, Clarke	•••	"	557
MEMECYLEE		513	manillanum, Naud	•••	,,	559
Memecylon, Linn	. ii.	553	microstomum, Clarke	•••	,,	557
acuminatum, Sm	. ,,	562	myrsinoides, Bl	ii.	555,	563
acuminatum, Wall	. ,,	565	myrtifolium, Wall	•••	ii.	564
amabile, $Bedd$. ,,	555	Myrtilli, Bl	•••	,,	561
ambiguum, Bl	. ,,	557	obtusum, Wall	•••	,,	564
Amherstianum, Clarke	. ,,	557	orbiculare, Thw		"	560
amplexicaule, Roxb	. ,,	569	ovatum, Sm		,,	564
angustifolium, Wight	. ,,	562	ovoideum, Thw	• • • •	,,	556
Arnottianum, Thw	. ,,	553	pachyderma, Wall	• • • •	,,	561
australe, F. Muell	. ,,	555	parvifolium, Thw		,,	55 6
oæruleum, Jack		559	pauciflorum, Bl		,,	55 5
campanulatum, Clarke	. ,,	563	paucistorum, Wall. ii.	565	, iii.	133
Campongum, Miq	. ,,	554	phyllanthifolium, Thw.		ii.	563
capitellatum, Heyne		564	plebejum, Kurz		,,	561
capitellatum. Linn		564	prasinum, Naud		,,	564
capitellatum, Thw		564	procerum, Thw		,,	556
celastrinum, Kurz	••	558	pulchrum, Kurz	•••	"	559
cerasiforme, Kurz		557	punctatum, Presl	•••	"	564
cordatum, Wall		559	pyrifolium, Naud		"	563
costatum, Miq	• • • • • • • • • • • • • • • • • • • •	558	pyrifolium, Presl		"	564
cunsatum, Thw	•••	564	pyriforme, Wall	•••	"	565
deccanense, Clarke	• • •	560	ramiflorum, Griff	•••	"	564
depressum, Benth		559	revolutum, Thw		"	560
edule, Roxb		563	rhinophyllum, Thw			562
edule, Lamk		573	rostratum, Thw		"	562
	. 563		Royenii, Bl		"	564
elegans, Kurz		554	rubro-cæruleum, Thw.		"	564
elegantulum, Thw	• • •	555	scutellatum, Naud	•••	"	564
ellipticum, Thw	•••	556	sessile, Wall		559,	
flavescens, Triana		562	subquadrangulare, DC.		ii.	564
	499		subtrinervium, Miq.			565
	••	562	sylvaticum, Thw	•••	"	561
		561	terminale, Dalz	•••	"	558
~	"	553		•••	"	563
	"	563	umbellatum, Benth	•••	"	555
globiferum, Wall	• • •	555	7 77	•••	"	561
gracile, Bedd	"	557	umbellatum, Bl umbellatum, Burm	;;; e	63,	
grande, Retz	"	558	umbellatum, Heyne		ii.	564
grande, Bl	"	564		•••	и.	564
grande, Wall	"	554		:: ,	556.	
Griffithianum, Naud	"	558	umbellatum, Wall varians, Thw	11. 0	ii.	556
Griffithianum, Kurz	,,	557	Vosmærianum, Scheff.	•••		561
heteropleurum, Bl	"	560		•••	"	564
Heyneanum, Benth	"	560	Walkeri, Hook	•••	"	560
Heyneanum, Wight	"		Wightianum, Triana Wightii Thu	•••	"	
Hookeri, Thw	554	554	Wightii, Thw		,,	554 584
21 701	554,		Memorialis ambigua, Wed			583
intermedium, Bl	ii.	561	aquatica, Wedd	•••	"	
jambosoides, Wight	**	560	bracteata, Wedd	•••	••	585 595
lævigatum, Bl	"	561	caudata, Wedd	•••	,,	585 500
laxiflorum, Wall	"	557	ciliaris, Ham	•••		583
loucanthum, Thw	"	564	concinna, Wedd	•••	,,	584 894
lucidum, Presl	"	564	cordata, Wedd	•••	••	584 507
lutescens, Presl	"	559	Dalzellii, Wedd	•••	••	587 505
madrocarpum, Thw	"	556	hirta, Wedd	•••	"	585

Memorialis	Vol.	Page	Mentha	Vol.	Page
hispida, Ham	٧.	586	quaternifolia, Heyno .	i⊽.	639
hispida, Wedd v.	585,	586	Royleana, Benth	,,	647
integrifolia, Wedd	٧.	587	rugosa, Herb. Heyne .	,,	638
mysorensis, Wedd	,,	586	sativa, Linn	,,	647
nilghirensis, Wedd	"	584	l	,,	648
parnifolia, Wedd	,,	587		. ,,	632
pentandra, Wedd	"	583	stallate House	. ,,	640
quinquenervis, Ham	"	586	. A. 21. 4 . T	., ,,	640
quinquenervis, Wedd	"	586	and the second of the second o	,,	647
117 - 3.3		585			638
117 - 191	"	584	m. 42.71 A . 15 15 m		640
7 757 1.3	**	587		,,	640
Mengea tenuifolia, Moq	iv.	722	and all Title III desires	,,	647
	i.	94	1)	,,	610
		595	37	,,,	94
Menispermea, Griff	"	000		iv. iv.	130
Menispermum acuminatum,		00			
Lamk	1.	99		,,	132
Cocculus, Linn	**	98	campestris, Macrae &		100
cordifolium, Willd	;;	97		,,	132
crispum, Linn	"	96		,,	132
fenestratum, Gwrtn	,•	99		,,	131
heteroclitum, Roxb	,,	98		. ,,	132
hirsutum, Linn	,,	101		,,	131
laurifolium, Roxb	,,	101	l	,.	130
malabaricum, Lamk	,,	96	Meoschium aristatum, Bean	v. vi1.	127
myosotoides, Linn	,,	101	Arnottianum, Neos	,,	127
orbiculatum, Linn	,,	104	barbatum, Beauv	,,	127
peltatum, Lamk	,,	101	clatum, Nees	,	127
polycarpum, Roxb	,,	99		,,	128
radiatum, Lamk	,,	99	1 (1 'A'A' 1' ' 'A' - 0 A	,,	127
tomentosum, Roxb	٠,	96	1	,,	127
triandrum, Roxb	,,	100	1 127 0 A	,,	127
tuberculatum, Lamk	,,	96	M A	,,	127
verrucosum, Roxb	"	96	7) NI	, ,,	128
villosum, Lamk	"	101	N7	,,	128
		102	was was Wall	,,	128
3.5	۰٬۰ i۷.	647		,,	130
		647	1 100 2 10 37	,,	128
	,,	648	Wightii, Nees	. ,,	128
	,,	618	Mephitidia attenuata, DC		181
	**	638	A1.		187
11 1 00	"	644			179
	"	614	Gardneri, Thw		186
blanda, Wall fætida, Burm	"	638		. "	184
	"	632	Mr. mt		180
? fruticosa, Roxb	,,	647	1		183
incana, Willd	,,	648	i i mu	,,	186
javanica, Bl	"			,,	189
malabarica, Heyne	"	640 638	of the comment of Manager	. ,,	180
myosuroides, Roth	•,		1 1 m	,,	185
ocimoides, Lamk	27	610	thizophyllus, Thw		
ovata, Cav	"	616		,,	170
paniculata, Roxb	19	614		. ,,	189
perilloides, Willd	,,	616			185
piperita, Linn	,,	647	varians, Thw iii. 180		
pumila, Grah	"	640	Walkeriana, Thw	iii.	
quadrifolia, D. Don	••	639	Wallichii, W. & A	. ,,,	180
quadrifolia, Roxb	**	639	sp., Griff iii. 189	192,	198

Mephitidia Vol.	Page	Methonica	Vol	Page
sp., Hk. f. & T. iii. 183, 184, 187	190	superba. Lamk	vi	358
Mercurialis alternifolia,	•			481
Desv v.	412	inermis. Mart		481
Merendera, Ramond vi.	356	Rumphii, Mart Sagus, Rolth	;,	481
Aitchisoni, Hk. f ,,	357	Sagna Rolth	.,	401
persica, Boiss. & Kotsch. ,,	357	Meyenia Hawtayniana, Nees	iv.	
Meriandra, Benth iv.	652	longiflura, Benth	• • •	391
Landa Danish	653	Meyera Helonycha, Han	111	
. 1 . 1 . 1 . 1 . 1	652	lapsu Megera.	••••	
Mertensis, Roth iv.	169	orientalis, D. Don		291
	170	Mezierea Griffithianu, A. DC.	. i.	644
.1	170	- TOO		643
147:11-1-6	170	m =	•	257
	170	1		258
	171	enneaphyllum, $W. S. A. \dots$	•	258
racemosa, Bentu ,,	171			258
tibetica, Clarke ,	170	glabrum, Desf		
<i>sp.</i> , Hk. f. & T ,,	170	macrophyllum, Bl		258
Mesoclastes brachystachys,	23	pubescens, Desf		259
Lindl vi.		sumatranum, W. S. A		259
uniflora, Lindl ,,	44	Michelia, Linn	1.	42
Mesodactylus dejlexa, Wall. vi.	175	aurantiaca, Wall	**	42
Mesona, Blume iv.	611	Catheartii, Hk. f. J. T	"	42
Wallichiana, Benth ,,	611	Champaca, Linn	;;	42
Mesoptera, Hk . f iii.	136	Doltsopa, Ham	"	42
Maingayi, $Hk. f.$,,	137	excelsa, Bl	,,	4:3
Mespilus acuminata, Lodd. ii.	385	glauca, Wight	٠,,	44
affinis, D. Don "	385	Kisopa, Ham	"	43
Bengalensis, Roxb "	371	lactea, Wall	"	43
crenulata, D. Don ,,	384	lanuginosa, Wall	,,	43
Cuila, Ham ,,	372	macrophylla, D. Don	"	41
japonica, Banks "	372	nilagirica, Zenk	,,	44
tinctoria, D. Don "	371	oblongs, Wall	,,	43
Messerschmidtia hispida,		ovalifolia, Wight	"	44
Benth iv.	148	pulneyensis, Wight	"	44
Mesua, $Linn$ i.	277	punduana, Hk. f. & T	"	43
coromandeliana, Wight	277	Rhecdii, Wight	"	42
ferrea, Linn ,,	277	rufinervis, DC	"	42
?lepidota, T. And "	278	velutina, DC	,,	43
Nagana, Garda "	277	Walkeri, Wight	"	14
	277	Michelia, Amman	iŸ.	582
	277	spinesa, Amman	,,	582
mulaballa Di & Tr	277	Micranthemum indicum, Hk.	"	
Dantanald Winhe	277	f. & T	iv.	286
autinia Di & The	277	Micronthus oppositifalius	•••	
and man boottom. There	$\tilde{277}$	Micranthus oppositifoliu, Wendl	iv	4.7
W-11	276	Micrargeria, Benth		303
	277	Winhtii Danih		303
speciosa, Chois ,, speciosa, Thw ,,		Wightii, Benth	:::	670
speciosa, Thw ,,	278 278	Micrechites, Miq		671
Thwaitesii, Pl. & Tr ,		elliptics, Hk. f	**	
Walkeriana, Pl. & Tr ,	277	polyantha, Miq	."	671
Metabolus caruleus, Bl 111.	58	Microcalamus Prainii, Gamb.	₹11.	000 000
lineatus, Bartl "	58	1 2 2 2	i▼.	
prostratus, Bl ,,	62	alterniflora, Bl	"	287
venosus, Bl ,,	59	cochlearifolia, Sm	"	287
Metachilicum cyathiferum,		diandra, Griff	"	287
Lindl vi.	83	mucosa, Br	33	287
Methonica Doniana, Kunth "	3 58	spathulata, Benth	22	288

Vol. Page	Micropyxis Vol. Page
Microchites (see Microchites)	tenella, Wight iii. 506
Microchloa, Br vii. 283	Microrhynchus, Less iii. 414
elongųta, Br ,, 283	acaulis, Kurz ,, 396
setacea, Br ,, 283	asplenifolius, DC " 415
Microchlana davescens,	• skandaillaidas Olauka " 115
O 1	6-11- 1 4 D " 41G
	900
quinquelocularis, W. & A. ,, 371	glaber, Wight ,, 396
Microcos Mala, Ham i. 393	glomeratus, J. & S ,, 417
paniculata, Linn ,, 393	nudicaulis, Less ,, 416
Struntoniana, G. Don ,, 393	patens, DC ,, 403
	11C
and the state of t	, , , , , , , , , , , , , , , , , , , ,
caseariæfolia, Planch , 380	
Microelus Roeperianus,	javensis, $Bl.$,, 77
W. & A v. 345	virens, Hk.f ,, 77
Microglossa, DC v. 256, 671	Microschoenus, Clarke vi. 675
albescens, Clarke v. 257, 671	Duthiei, Clarke , 675
cabulica, Clarke v. 257	Microstachys Chamalea, A.
O JEAN OF THE STATE OF THE STAT	Juss v. 475
* T. 11. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	77 1 21 75 41 410
volubilis, DC , 257	
zeylanica, Benth ,, 257	sp., Wall v. 473, 474
Microgynæcium, Hk , f v. 9	Microstegium Wilblenowia-
tibeticum, $Hk. f.$,, 9	num, Nees vii. 117
Microlana spectabilis, Wall. i. 371	Microstylis, Nutt v. 683
Microloma angustifolia, Ham. iv. 64	acutangula, Hk. f , 688
pyrotechnica, Spreng , 64	1-II. Dati & Con
	7) 22 March " 200
Micromeles, Done ii. 377	
castaneifolia, Done ,, 379	biloba, Lindl ,, 686
Griffithii, Done ,, 377	congesta, Rchb. f. v. 689, vi. 181 crenulata, Ridl. v. 691, vi. 181
Griffithii, Done ,, 377 khasiana, Done ,, 378	crenulata, $Ridl$. v. 691, vi. 181
rhamnoides, Done ,, 377	cylindrostachya, Rchb. f. v. 689
verrucosa, Done ii. 378, 379	discolor, Lindl ,, 689
Micromelum, Bl i. 501	flavescens, Lindi ,, 690
	, in a
	fusca, Rchb. f v. 689, 690
monophyllum, Wight ,, 510	
pubescens, Bl ,, 501	Josephiana, Rehb. f v. 687
Micromeria, Benth iv. 649	khasiana, Hk . f . v. 686, vi. 181
biflora, Benth ,, 650	lancifolia, Thuc v. 691
capitellata, Benth ,, 649	luteola, Hk. f. & T ,, 691
Tradecuidia Hala 650	luteola, Wight " 691
Walantiniana Damali. REO	Maingayi, Hk , f , 689
Micropera, Dalz vi. 55	
Micropera, Lindl vi. 33	parvula, Hk. f , 690
maculata, Dalz ,, 64	plantaginea, Steud ,, 688 polyodon, Hk. f. v. 688, vi. 181
pallida, Lindl vi. 36, 67	polyodon, Hk , f . \forall . 688, \forall i. 181
pallida, Wall vi. 36	pratensis, Ridl v. 691
13.4 D 1-	purpures, Lindl ,, 687
	Rheedii, Wight v. 690, vi. 181
	Rheedii, Lindl v. 688
pusillum, Miq , 99	
Micropora, Hk. f v. 189	Rheedii, Rohb. f ,, 688
Curtisii, Hk. f v. 189, 862	Scottii, Hk f v. 687, vi. 181
Micropterya stricta, Walp ii. 189	Stocksii, Hk. f v. 691
	trilobulata, Kurz ,, 689
100	versicelor, Wight ,, 691
Micropyxis pumila, Duby iii. 506	versicolor, Lindl. v. 690, vi. 181
zawiopywis pumiu, waby m. 000 i	

Microstylis	Vol. I	Parro I	· ·	v	'ol 1	Page
Wallichii, Lindl	V.	686	Miliusa, Leschen	*	i.	86
Microtinus, Oerst	iii.	7	imaina Taraka			86
		613	macrocarpa, Hk. f. & T.	•••	"	86
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		614			"	86
bivalvis, Wall				•••	"	_
	i. 625, ii.				"	87
densiflora, Wight	i.	614	Roxburghiana, Hk. f. d	1.	"	87
discolor, Wall	,,	614			,,	87
latifolia, Wight	,,	613	Wallichiana, Hk. f. &	Т.	"	87
? longifolia, Wall	i. 613,		Wightiana, Ilk. f. & T.	•••	,,	87
microcarpa, Wight	i.	614	neylavica, Gard	•••	"	87
ovalifolia, Wight	,,	614	MILIUSEÆ		i.	47
ramiflora, Wight	,,	613	Millettia, W. & A		ii.	104
Wallichiana, Wight	,,	613	-A Dintl	•••	,,	108
Microula, Benth	iv.	167	ammiamlasa Dalem		"	108
Benthami, Clarke	,,,	167	Brandisiava, Kurz		,,	108
Mikania, Willd	iii.	244	amenta Dulini.			107
chenopodifolia, Willd.		214	cana, Benth		"	105
chenopodioides, Wall.	*** 33	354	1 4 70 1	•	"	109
	,,			•••	"	106
clematidea, Wall	::: 014	243	cinerea, Benth	•••	"	
longican is, Wall	iii. 214,		eriantha, Benth	•••	"	108
scandens, Willd	ii'.	244	extensa, Benth	•••	"	109
volubilis, Willd	,,	214	fruticosa, Benth	• • •	"	109
Miliosaccharum, Nees	vii.	69	glaucescens, Kurz	•••	"	107
Milium, Linn	vii.	235	leiogyna, Kurz	•••	,,	109
arundinaceum, Koen.	,,	52	leucantha, Kurz		,,	105
ascendens, Roxb	,,	235	? Maingayi, Baker	•••	,,	110
capillaceum, Koen	,,	19	monticols, Kurz	•••	"	106
capillare, Roth	,,	51	ovalifolia, Kurz		"	107
Carar, Ham	,,	20	pachycarpa, Benth	• • •	"	106
cimicinoides, Roxb	,,,	70	pallida, Dalz	•••		105
cimicinum, Linn		64	pendula, Benth	•••	"	105
Crus-galli, Moench		31	10		"	107
• • • •	,,	235	1 77	•••	"	106
m	,,	235		•••	"	104
	,,	45	pulchra, Benth	•••	"	
esculentum, Monoh	,,		racemosa, Benth	•••	"	105
filiforme, Roxb	,,	18	rubiginosa, W. S A.	•••	"	104
globosum, Thunb	,,	25	sericea, 11'. & A	•••	"	104
Languchinia, Ham	,,	20	splendens, W . & A	•••	,,	104
laterale, Regel	,,	234	tetraptera, Kurz	•••	"	106
maritimum, Koen	,,	99	thyrsiflora, Benth	•••	,,	246
minutiflorum, Triu	,,	20	Millingtonia, Linn. f	•••	i∀.	377
orivense, Roxb	,,	21	hortensis, Linn. f	•••	,,	377
ovatum, Heyne	,,	19	Millingtonia, Roxb	•••	11.	3
Panicum, Mill	,,	45	Arnottiana, Wight		"	6
phleoides, Sw	. ,,	235	dilleniæfolia, Wall	`	,,	4
polystachyum, Spreug.		20	integrifolia, Wall			4,5
punctatum, Koen		19	pinnata, Roxb		"	6
T !	• • •	20	377 13	•••	"	4
TS TS	,,	18		•••	"	5
	· "	21	simplicifolia, Roxb	•••	"	6
ramosum, Retz			sumatrana, Jack	•••	"	
sanguinale, Roxb		19	Mi/nea apiocarpa, Thw.	• • •	1.	555
setaceum, Koen.	vii. 18		edulis, Roxb	•••	"	556
striatum, Ham	Vii.	19	? racemosa, Roem	•••	"	55±
tenerum, Hoyne	,,	323	Roxburghiana, W. & A.	•••	"	555
tomentosum, Koen		51	Roxburghii, Wight	•••	"	555
Treutleri, O. Kuntze	vii. 240,		sp., Kurz		,,	555
triracemosum, Roxb.	••• ,,	18	Mimosa, Linn	• • • •	ii.	291

GENERAL INDEX.							
Mimosa		37-1 3	n	Mimosa	** . 1	D	
abstergens, Spreng.		Vol. I	296	Oliviana Dank	::	Page 298	
Adenanthera, Roxb.			286			300	
0.1			288	· +		298	
21 75 113	•••		294	speciosa, Jacq spinosiliqua (spinosisiliqua		200	
11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		"	294	Th - 441		291	
		"	301	adding Image Daugh	. ,,	300	
1 1 1 1 T			293	0 D. 1	. ,,	294	
. '.		•••	300	G J D J.	. ,,	295	
		"	291	tamariscina, Heyne		294	
· · · · · · · · · · · · · · · · · · ·		"	303	tenuifolia, Roxb		297	
biglobosa, Roxb.		"	289	1. 1. n.t		294	
cæsia, Linn			297	1 4 4 70 1	,,	297	
Catechu, Roxb		• •	295	D 1	,,	305	
catechnoides, Roxb.			295	1	,,	286	
cinerea, Linn			288	1 7 77 4 37 13	. ,,	303	
concinna Willd.		• • • • • • • • • • • • • • • • • • • •	296		,,	290	
concordiana, Roxb.			303	D	"	286	
cornigera, Linn.			296	36 5	ii.	61	
dulcis, Roxb			302	361 1 7	i∀.	258	
dumosa, Roxb			296		,,	258	
eburnea, Linn. f.			293	l managilia Du	,,	259	
eburnea, Roxb			293	1 7.5	,,	278	
elata, Roxb			299		,,	279	
frondosa, Heyne			294		,,	258	
Farnesiana, Linn.			292	orbicularis, Benth	,,	259	
ferruginea, Kottl.			2 97	strictus, Benth	,,	259	
ferruginea, Roxb.			295	? tenellus, Bunge	,,	259	
hamatu, Willd		, ,,	291	Mimusops, Linn	iii.	548	
heterophylla, Roxb.		,,	306	? attenuata, Wall	,,	537	
horrida, Sm		. ,,	293	Balota, Bl	,,	549	
Intsia, Linn		,,,	297	Browniand, Bouth	,,	549	
Jiringa, Jack		,,	205	dissecta Br	,,	249	
Kæringa, Roxb		91	305		,,	518	
Kalkora, Roxb		,,,	300		,,	549	
Kleinii, Poir		,,	294		,,	549	
Latronum, Linn.		, ,,	296		,,	549	
leucophlica, Roxb.	::		294		,,	549	
lucida, Roxb	ii	299,			,,	549	
marginata, Lam.	•••	ii.	299		,,	549	
microphylla, Roxb.	• • • • • • • • • • • • • • • • • • • •	,	801	1	,,	549	
monadelpha, Roxb.	•••	,,,	303	1	,,	547	
mutabilis, Roxb.	•••	. ,,	291		. ,,	534	
natans, Roxb	•••		285		,,	548	
nitida, Vahl	•••	"	303	Minyranthes heterophylle	***	304	
obovata, Roxb	•••	•••	296	Turoz			
octandra, Roxb.	•••		291		i.	593	
odoratissima, Linn.			299 280		,,	593 593	
pedunculata, Roxb.			289		,,	594	
pennata, Lion	•••	••	297 299	l weight and make a	,,	593	
procera, Roxb	•••	•••			,,		
pudica, Linn	••• ••	••	291 301	1	Vii.	244	
pulchella, Roxb.	•••	•••	291	1	,,	242	
rubicaulis, Lam.	•••	••	291	97 11 A 6 M	,,	243	
Rottleri, Spreng.	•••		296	30	,, iv.		
rugata, Lam	•••	••	287			. 107	
scandens, Linn	•• ••	•••	211	1 710 30 41		108	
sepiaria, $Benth$.	••• ··	* **	# ·L	1 controler, morron	,,	-00	

Miscanthus	Vol.	Page	Modecoa	Vol.	Page
fuscus, Benth	• •	120	integrifolia, Lam	. ii.	603
nepalensis, Hack	,,,	107	integrifolia, Wall	. ,,	603
nadipes, Hack		107	nicobarica, Kurz	. ,,	603
sinensis, Anderss		118	palmata, Lam	. ,,	603
 Mischocarpus sumatranus, Bl. 	. 1.	679	populifolia, Bl	. ,,	603
sundaicus, Bl	. ,,	678	singaporeana, Mast	. ,,	601
Mischodon, Thw	v.	344	trilobata, Roxb	. ,.	602
zeylanicus, Thw	,,,	344	tuberosa, Roxb	. ,,	603
Mischospora efoliata, Boeck	. vi.	631	Wightiana, Wall	٠,,	601,
Missiessya hypoleuca, Wedd	▼.	591	MODECCE.E		599
velutina, Wedd	٠.,	59 0	Modeccopsis vaga, Grift		578
Wallichiana, Wedd	,,	591	Mogorium pubescens, Lamk.	iii.	592
Mitopetalum Wightii, Bl	٧.	821	Sambac, Lamk	. ,,	591
speciosum, Bl	,,	822 .	triftorum, Lamk	. ,,	598
Mitrasacme, Labill		79	undulatum, Lamk	. ,,	591
alsinoides, Br	,,	80	vimineum, Lamk		598
capillaris, Wall	,,	80	Mohlana nemoralis, Mart	. v.	21
chinensis, Griseb	,,	80	Molina racemosa, Lamk	. i.	418
crystallina, Griff		80	Molinæa canescens, Roxb	. i.	671
indica, Wight	,,	80	sp., Wall	. ,,	678
malaccensis, Wight		80	Molineria capitulata, Herb	. vi.	278
nudicaulis, Reinw	,,	80	crassifolia, Baker	. ,,	279
polymorpha, Br	•,	80	Finlaysoniana, Baker	. ,,	279
pusilla, Dalz	,,	80	gracilis, Kurz	. ,,	278
trinervis, Span	,,	80	latifolia, Kurz	. ,,	280
Mitreola, Linn		79	plicata, Colla	. ,,	278
inconspicua, Zoll. & Morr.	,,	79	plicata, Kurz	. ,,	280
oldenlandioides, Wall	,,	79	recurvata, Herb	. ,,	278
paniculata, Wall	,,	79	sumatrana, Herb	. ,,	280
pedicellata, Benth	"	79	Molinia aquatica, Wibel		310
petiolata, A. DC	"	79	carulea, Moench	i.	273
Mitrephora, Bl	i.	76	Mollia corymbosa, Willd	i.	245
Pexcelsa, Hk. f. & T	"	77	spadicea, Willd	, ,,	245
grandiflora, Bedd	"	78	Mollugine	, ii.	659
Heyneana, Thw	,,	77	Mollugo, Linn	. ii.	662
Maingayi, Hk. f. S. T	,,	77	bellidiflora, Ser	. ,,	664
obtusa, Bl	"	76	Cerviana, Ser	. ,,	663
reticulata, Hk. f. & T	,,	77	disticha, Ser		663
tomentosa, Hk. f. & T	,,	76	Glinus, A. Rich	. ,,	662
MITREPHOREE	1.	46	hirta, Thund	. ,,	662
Mitrosicyos lobatus, Maxim.	ii.	633	Linkii, Ser	, ,,	668
Mnesithea laevis, Kunth	vii.	158	lotoides, W. & A	·' "	662
Mnianthus longipes, Walp	v.	63	nudicaulis, Lamk	. ,,	664
pulchellus, Walp	,,	62	parviflora, DC	. ,,	662
seylanicus, Walp	,,	62	pentaphylla, Linn	13	663
Mniopsis Hookeriana, Tul	٧.	66	Spergula, Linn	, ,,	662
Johnsonii, Wight	,,	66	striota, Linn	19	663
selaginoides, Bedd	,,	68	triphylla, Lour	. ,,	663
Moacuira gelonioides, Roxb.	i.	570	umbellata, Ser	, ,,	663
Modecca, Lam	ii.	601	verticillata, Roxb	, ,,	662
aliena, Wall	,,	603	Moltkia, Lehm	, i v .	171
apiculata, Mast	٠,,	603	parviflora, Clarke	. ,,	171
cardiophyila, Mast	"	€02	Molucella Marrubiastrum,	_	
cordifolia. Bl		602	Steph		671
diversifolia, Wall furfuracea, Wall	"	601	Momordica, Linn	ii.	616
furfuracea, Wall	,,	603	Balsamina, Linn	71"	617
? heterophylla, Karz	,,	602	Balsamina, Wall	, ,,	617
- - · · ·			•		

Momordica		_	Monochilus	40.1	m
		Page	4 777 11	Vol.	
calcarata, Colebr., see Erre			flavus, Wall	. vi.	108
calcarata, Wall	ii.	631	galeatus, Lindl	. ,,	107
Charantia, Linn	,,	616	longilabris, Lindl	. ,,	108
cochinchinensis, Spreng.		618	nervosus, Wall		108
Z1 1 1 1 77 1		618			108
	-	618		-:	362
denudata, Thw			Monochoria, Prest		
dioica, Roxb	,,	617	dilatata, Kunth	• 31	363
dioica, Wall	"	618	hastæfolia, Presl	. ,,	362
Hamiltoniana, Wall	,,	617	hastata, Solms	. ,,	362
Heyneana, Wall		617	linearis, Mig	. ,,	363
		617	pauciflora, Kunth & Miq.		363
		614			362
Luffa,Linn	"		sagittata, Kunth		
Missionis, Wall	"	617	vaginalis, Presl		363
mixta, Roxb	"	613	Monocyclis robusta, Wall	i.	565
monadelpha, Roxb	, ,,	621	Monolophus, Wall	vi.	222
muricata, DC		617	elegans, Wall	. ,,	222
Paina. Wall		634	linearis, Wall		223
		617	1 1 1 1	-	224
renigera, Wall					223
senegalensis, Lauk	**	617	secundus, Wall		
subangulata, Bl	17	617	Monomeris, Lindl	. ₹.	781
tubiflora, Roxb	,,	611	barbata, Lindl	. ,,	781
tubifora, Wall		615	Crabro, Par. & Rehb. f		781
umbellata, Roxb		625	Monoon canangioides, Miq		64
ARR 11. 1 11 75		617			369
Wallichii, Roem			1	. i∇.	370
Monarda zeylanica, Burm		672		* **	
Monardeze		606	Monoporandra, Thw		316
Monenteles spicatus, Labill.	iii.	275	cordifolia, Thw	. 303,	
Monerma repens, Benuv		36 >	elegans, Thw	. i.	317
Monetia barlerioides, L. He it.		620	lancifolia, Thw		316
		620	Monosoma littorata, Griff	. ".	567
Brunoniana, Wall	• • •				534
lava, Planch	, ,,	620	Monothecumascatensis, A. DC.		
sarmentosa, Baill	• ,,	620	Monothecium, Hochst	iv.	523
tetracantha, Salisb	1.	425	aristatum, T. Anders	. ,,,	524
MONIMIACEÆ	٧.	114	Monotropa, Linn	, in.	476
Monocera, Jack	_	404	Morisoniana, Michz		476
		409	uniflors, Linn		476
					476
ferruginea, Wight		406	sp., Griff		476
glandulifera, Hook	,,,	4 07	MONOTROPEÆ	. 111.	
Griffithii, C. Mull	"	407	Monoxora spectabilis, Wigh	t ii.	469
Griffithii, Wight		408	Monsonia, Linn	, i.	427
holopetala, Tures., lapsu			chumbalensis, Wight		427
		408	heliotropioides, Cav		428
			heterotricha		435
leucobotryum, Miq		407			427
macrocera, Turcz., lapso	ı		Lawiana, Stocks		
Zoli	. ,,	405	mallica, Edgew	. ,,	428
Munroii, Wight	,,,	407	senegalensis, Guill. &		
petiolata, Jack		408	Perr i.	427,	435
		408	Monstera decursiva, Schot		547
		405	giyantea, Schott		548
Rozburghii, Wight					547
subintegerrima, Miq	, ,,	405	glauca, C. Koch		
trichanthera, Griff	. ,,	403	Peepla, Schott	. ,,	545
tulerculata, W. & A		405	pinnatifida, Schott	• ,,,	549
Walkeris, Wight		406	Moonia Arnottiana, Wight	. iii.	303
Monochilan Wall		107	heterophylla, Arn		303
Monochilur, Wall					196
affinis, Lindl	17	109	Moorcroftia adpressa, Chou		196
affinis, Wight	. ,,	108	penangiana, Chois	• ;;	
Mabellatus, Wight	,,,	106	Moorva, As. Res	. V1.	2/1

•					
	Vol.			Vol.	
	vi.	277	Moriudopsis, Hk. f	iii.	121
MOREÆ v. 478		271	capillaris, Kurz	79	121
Morgania aspera, Spreng	iv.	279	Moringa, Lamk	ri.	45
hyssopioides, Spreng	"	283	concanensis, $Nimm$	17	45
juncea, Spreng	"	274	oleifera, Lamk	"	45
lucida, spreng	"	279	polygona, DC	"	45
Moricandia, DC	١.	158	pterygosperma, Grtn	,,	45
arvensis, DC	"	158	zeylanica, Pers		45
tortuosa, Hk. f. & T	,,	158	Moringeæ	ii.	45
Morina, Linn	nii.	216	Morisia Wallichii, Nees	vi.	668
Aucheri, J. & S	,,	216	Morocarpus angustalus, (an		
betonicoides, Benth	,,	217	gulatus), Bl	v.	590
brevittora, Edgew	,,	216	longifolius, Bl	,,,	590
Coulteriana, Royle	,,	216	microcephalus, Benth		590
elegans, Fisch. & Lallem.	"	216	salicifolius, Bl		591
græca, J. & S	"	216	Wallichianus, Kurz		591
longifolia, Wall	"	216	Wallichianus, Thw		592
nana, Wall	,,	217	Morus, Linn		491
nepulensis, D. Don		217	? acidosa, Griff		492
persica, Linn		26	alba, Linn		492
polyphylia, Wall		216	alba, Bureau		492
Tournefortii, J. & S	"	216	atropurpurea, Roxb	• • •	491
Wallichiana, Royle	"	216	bifaria, Hort. Calc		493
Morinda, Linn		155	Cudranus, Ham		538
angustifolia, Rowb	"	156	cuspidata, Wall	"	492
angustifolia, Roth	"	156	glabrata, Wall	"	493
aspera, W. & A		156	indica, Linn		492
bracteata, Rozb	••	156	lavigata, Wall		492
(hacuca, Ham		156	pabularia, Dene		492
		, 156	paniculata, Roxb		589
citrifolia, Bedd		156	parvifolia, Royle		492
Coreia, Ham		156	7)1		492
exserta, Roxb		156	serrata, Wall		492
lanceoluta, Wall	••	157	tatarica, Linu	,,	492
leiantha, Kurz		156	To con our	.,	492
multiflora, Roxb.	••	156	viridis, Ham.		493
Naudia, Ham	•	156	Moschosma, Rchb	."	
nodosa, Ham	"	1 6	ocimoides, Rehb		647
Dadawaya Tuna		157	and the state of the same of the same	•	612
persicufolis, Ham	• • • • • • • • • • • • • • • • • • • •	157	Mosla, Ham	•	646
polysperma, Jack	••	93	Alan Aliman Mandan		647
rigida, Miq	.,	157	1	• • • • • • • • • • • • • • • • • • • •	647
annadana Dark	• • •	157	Moulinsia cupanioides, Camb		672
amanian Wall		158	I make the control of		672
and a succession and the second		157	1 36		185
.i	• • •	156	and the A. Coul		185
Asturiadire Teels		157	70711	-	185
Teysmanniana, Miq		156	1 TO	• • •	186
ti-atonia Dark	•••	156	1 1 5 1 10		186
tomontosa Homno		1:6	14 4 TTT 0. 4	"	187
manhallaga Tana	•	157	1 1 0 1		185
	• • • • • • • • • • • • • • • • • • • •	158	anistatu Tiama	••	185
487 337 i 17 72	,	158	l almonous DC		186
Wallinganiana Maa		156	gigantes, DC		193
			? gracilis, Grah		187
sp., Wall iii. 94, 121		172	birsuta, W. & A		185
Morindes i			imbricata, DC		186
MORINDEAS 1	40), 155	macrocarpa, Wall	. ,,	100

Vnome			Manne		D
Mucuna	•••	Page	Murraya		Vol. Page i. 503
monosperma, DC		185	Glenieii, Thw		ENO
monosperma, Wall	• • • • • • • • • • • • • • • • • • • •	185	Konigii, Spreng		້ ເດອ
nigra, Ham	•	188	paniculata, Jack		" = 00
nives, DC	. ,,	188	sumatrana, Roxb		,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
pruriens, DC	. ,,	187	Musa, Linn		vi. 261
prurita, Hook	. ,,	187	arakanensis, Kipiey		
recta, Wall	. ,,	207	assamica, Hort. Bull.		,, 263
utilis, Wall	. ,,	187	aurantiaca, Mann		., 263
velutina, Hassk	. ,,	187	Champa, Hort		,, 262
Muchlenbergia, Schreb	V11.	. 258	Cliffortiana, Linn		,, 262
Duthieana, Hack	. ,,	259	coccinea, Andr		,, 263
geniculata, Neen		259	corniculata, Kurz		,, 263
himalayensis, Huck		259	Dacca, Horan		,, 262
Huegelii, Trin		259	dasycarpa, Kurz		,, 263
sylvatica, Torr. & Gr		259	glauca, Roxb		,, 262
viridissima, Nees	• • •	259	Mannii, Wendl		,, 263
36.33		623	nepalensis, Wali		961
1.7		623	. 10		969
		623			" 969
maderaspatana, Kurz		623	paradisiaca, Linn		263
scabrella, Arn			rosacea, Jacq		263
Muldera diandra, Thw.	. v.	91	sanguinea, Hk. f.		262
galeata, Miq	. ,,	80	sapientum, Linu		,,
multinervis, Miq	. ,,	91	sikkimensis, Kurz	· ···	,, 262
trichostachya, Miq	. ,,	80	simiarum, Kurz		,, 262
Wightiana, Miq	. ,,	91	superba, Roxb		,, 261
Wightiana, Wight	. ,,	80	textilis, Nees		,, 263
Mulgedium cyaneum, DC	. iii.		textilis, Grah		,, 261
decipiens, Hk. f. & T	. ,,	407	troylodytarum, Linu.		,, 262
lævigatum, DC	. ,,	408	uranoscopos, Lour		,, 263
Lessertianum, DC		409	velutina, Wendl		,, 268
macranthum, Hk. f. & T		409	vittata, W. Ackm		,, 263
macrorhizum, Royle		408	zebrina, Van Houtte		,, 263
nilgherryense, Wight		408	Muscari bootanense, Gri		vi. 299
rapunculoides, DC		407	Muse		vi. 200
robustum, DC:		408	Mussenda, Linn		iii. 86
		406	calycina, Wall		Qu
14 4 D		405	cordifolia, Wall		″ 01
Munbya cyanochroa, Boise			ourymbosa, Roxb		″ 01
Mandales DC	• .		1 ^ · · •		97
		105			" en
pulchra, Benth		7.1.2			" 97
suberosa, Benth		110	? corymbosa, Wall		
Munnicksia, Dennstd		196	cuneifolia, D. Don		i. 34, 92
Munronia, Wight	٠. ٠.	542	Dovinia (Dorinia), Hi		iii. 89
neilgherrica, Wight	. ,,	543	flavescens, Ham		,, 89
pumila, Wight	. ,,	543	formosa, Linn		,, 89
Wallichii, Wight		543	frondosa, Linn		,, 89
Murdannia tuberosa, Royle	¥1	. 375	frondosa, Wall	. 1	ii. 87, 89
Muricia cochinchinensis,			glabra, Vahl		iii. 90
Lour	. ii.		glabra, Wall		" 88
Murraya, Linn	. i.		Griffithii, Wight		,, 88
brevifolia, Thw	. ,,	508	hispida, D. Don		,, 89
Burmanni, Spreng		504	incana, Wall		" 87
crenulata, Oliv		501	ingrata, Wall. ?		,, 89
elongata, A. DC		5 ∪3	Jelinekii (Jelinckii),	Kurz	" 88
ezotica, Lina	•••	502	Keenani, Hk. f		", 87
	••	554			" 88
exotica, Thw		508			" 36
	,,			• •••	,, 50

Mussænda	Vol.	Page	Myriactis	Vol.	Page
macrophylla, Kurz	iii.	91	carnosa, Wall	iii.	247
macrophylla, Wall	,,	89	Gmelini, DC	,,	247
? macrophylla, Kurz	,,	90	gracilis, Edgew	,,	247
parva, Wall	,	91	javanica, DC	,,	247
Towns at the Paris	,,	91	nepalensis, Less	,,	247
		90	oleosa, Edgew	,,	247
	,,	87	Wallichii, Less	,,	247
0 2 137 - 11	,,	87	Wightii DC	,,	247
337 - 11	,,	84	Myrialepta, Becc	. vi.	480
Dankanakii 111. f	,,	87	Scortechini, Becc	,,	480
	,	91	triqueter, Becc	,,	480
tomentosa, Wight	,,	88	Myrica, Linn	v.	597
damamenum Wichle	,,	90	canarensis, Miq	,,	266
uniflora, Wall	,,	86	Farquhariana, Wall.	,,	597
	,,	90	integrifolia, Roxb	,,	597
	,,	. 91	integrifolia, Wall	••• ,,	113
will and Cablants	,,	90	missions, Wall	• • • • • • • • • • • • • • • • • • • •	597
:11 XV-11	,,	89	Nogi, Thunb	,,	597
W2-11: 1.2: (1 7)	,,	88	rubra, Sieb. & Zucc.	,,	597
	,,	89	sapida, Wall		597
sp., llk. f. & T	,,	87	triplinervis, Mig	v.	266
	ii), l		MYRICACE.E	v.	597
	ii. 225		Myricaria, Desv	i.	249
1/ (1 D)		785	bracteata, Royle		250
7.7		790	elegans, Royle		250
	,,	791	germanica, Desv	,,	250
	,, a-		Hoffmeisteri, Klotz	,,	250
A 10	.,,	95	prostrata, Benth. & Hk.	£	250
		356	raginata, Desv	,,	249
	vi.	101	Myriogyne minuta, Less.	iii.	317
** · • • • • • •		162	Myrioneuron, Wall		96
**		173	augustifolium, IIk. f.		97
No. 11 At .		173	Olimber 1971 1	••• ,,	96
7 7 . 75.	•• ,,	163	717 11	,,	96
nonna 14	•• ,•	173	Myriophyllum, Linn	11.	432
	•• ,,	162			433
TT - 1 - 1 - 11 - 1	•• ,,	174		,,	432
	•• ••	174	indicum, Griff indicum Wight	,,	433
	,,	173		,,	433
	•• ••		intermedium, DC	,,	432
33731	,,	171 172	intermedium, Wight	,,	433
, "D	,,	173	lineare, Hayne spicatum, Linn	,,	433
	•• ,,	172		,,	433
	,,	172	tetrandrum, Roxb	••• ,,	432
ovalifolia, Wall	•• ,,	173	tuberculatum, Roxb.	,,	433
	,,	173	variæfolium, Hook	··· " .	433
	.,	171	verticillatum, Linn	••• ;;	10
	•• ,,	174	Myriopteron, Griff	iv.	11
4 . 216.77 33733	•• ,,	172	Horsfieldii (error = seq.)		
	•• ,,		paniculatum, Griff	977	11 421
	•: "	174	Myriostachya, Hk. f v		
	,,	173	Wightiana, Hk. f	,, 297,	
	•• ,,	175	Myristica, Linn	v. 102,	
	,,	165	amygdalina, Wall	v .	106
Myriachæta arundinace			amygdalina, Grah	,,	111
. 1		. 61	andamanica, Hk. f	,,	103
glauca, Mor	;;	61	? angustifolia, Roxb.	,,	111
Myriactis, Less	iii.	24/	aromatica, Lamk	,,	102

			,		
Myristica	Vol. Page	Myristica		Vol.	Page
attenuata, Wall		? obtusifolia, Wall	• • •	▼.	113
bivalvis, Hk , f		officinalis, Linn. f	•••	,,	102
Cantleyi, Hk. f	,, 110	paniculata, A. D.C		,,	108
ceylanica, A. DC	. , 103	pendulina, Hk. f		,,	859
corticosa, Bedd	111	polyspherula, Hk. f.		"	108
	. 110, 111	sapida, Steud			113
crassifolia, Hk. f. & T	100	sesquipedalis, Wall.		113.	151
dactyloides, Wall	1/10	sphærocarpa, Wall		ν.	109
diospyrifolia, A. DC	1/10	aphærula, Hk. f		,,	859
elliptica, Wall	1/10	P sumatrana, Bl			111
9 -112-42- 17	" 109	superbs, Hk. f. S. T.		"	105
erratica, Hk. f. & T	" 110	sylvestris, Houtt		"	859
eugeniæfolia, A. DC	"	tomentosa, Hk. f. S. T.		"	105
	. 107, 109	tomentosa, Bl	•••	**	112
77 1	1.00	? tomentosa, Grah	•••	**	103
	100		•••	**	103
ferruginea, Wall	110	tomentosa, Thw	•••	"	105
Finlayschiana, Wall	107	Waliichii, Hk. f. S. T. zeylanica, Thw	•••	,,	103
floribunda, Wall	100		•••	,,	
fragrane, Houtt	11.0	sp., Wall	•••	,,	113
furfuraces, Hk. f. & T		sp., Malacca	•••	,,	113
gibbosa, Hk. f. & T		sp., Singapore	•••	٠,	113
glabra, Bl		Myristicacea, Wall	•••	v.	105
glauca, Bl	. " 111	Myristicea, Wall	•••	v.	381
glaucescens, Hk. f. S. T	. " 111	MYRISTICEÆ	•••	v.	101
glaucescens, Wall v	. 113, 161	Myrmeci is glabra, Bl		vi.	98
globularia, Hk. f. & T	. v. 108	Myrmecodia, Jack	•••	iii.	194
Griffithii, Hk. f	. ,, 109	nrmata, DC	•••	,,	194
Heyneana, Wall	. " 113	Pechinata, Gaud	•••	**	194
Hookeri, Wall	. " 113	? tuberosa, Bl	•••	,,	194
Hookeriana, Wall	. ,, 109	Myrobalanus bellirica bele	rica))	
Horsfieldii, Bl	. ,, 106	Gaertn		ii.	445
Horsfieldii, Bl. ? v		Che'nıla, Gaertn	•••	,,	446
hyposticta, Miq	. v. 104	citrina, Gaertn		,,	146
iners, Bl	119	Myrsine, Linn		iii.	511
integra, Wall	1417	acuminata, Royle		,,	511
integrifolia, Stoud	110	africana, Linn		,,	511
intermedia, Bl	" 119	arenis, A. DC		,,	512
Irya, Gaertn	100	bijaria, Wall		,,	511
Iryadghedi, Gaertn	106	capitellata, Wall		"	512
javanica, Bl	" 100	excelsa, D. Don		"	512
Kingii, Hk. f	100	glabra, Gaertn	• • • • • • • • • • • • • • • • • • • •	,,	511
1 1 1 117 11	" 111	khasiana, Kurz			512
1 10 11 7T1 C D. TT	. " 109	lanccolata, Wall	•••	•	512
	" 110	lepidocarpon, Wight	•••	"	512
laurina, Bl	" 110	1 1 1 117 11	•••	٠,	512
? linifolia, Roxb	" 110	30 1.17 171	•••	,,	516
longifolia, Wall	. 110, 113	neriifolia, Sieb. & Zacc	• • • •	• 1	512
, , , , , , , , , , , , , , , , , , , ,	101	pachysandra, Wall		"	531
magnifica, Bedd	101		•••	"	512
Maingayi, Hk. f	109	philippensis, A. DC.	•••	"	512
malabarica, Lamk	104	Porteriana, Wall	• • • •	"	511
malaccensis, Hk. f	110	Potama, D. Don	••••	"	
micrantha, Wall		retusa, Ait	••	11	511
missionis?, Wall		rotundifolia, Lamk	•••	"	511
montana, Rozb		scabra, Gaertn	•••	,,	511
moschata, Thunb		semiserrate, Wall	•••	"	511
Murtoni, Hk. f		sessilis, D. Don	•••	٠,	511
notha, Wall	. ,, 103	subspinosa, D. Don	•••	"	512

Myreine	Manaia a		_	Maine		_
September Sept	Myrsine			Naias		
Pundulata, Wall.		, iii.	512		-	
MYRTA.E.E.	2 andulata Well					
MYRTA.E.E.	Wichtians Wall					
MYRTKE. ii. 462 minor, Allioni 569 Myrtus acuminatissima, Bl. ii. 483 muricata, Del. 569 Amboinensis, Rumph. 44:1 seminuda, Griff. 570 braziliana, Linn. 462 seminuda, Griff. 569 braziliana, Linn. 505 seminuda, Griff. 569 canescens, Lour. 469 servistipula (semistipula) 81b. 569 comescens, Lour. 469 servistipula (semistipula) 81b. 569 comescens, Lour. 469 servistipula (semistipula) 81b. 569 caryophyllata, Linn. 469 servistipula (semistipula) 81b. 569 commandeliama, Koen. 502 seminuica, Linn. 569 servistipula (semistipula) 16ternata, Rosb. 569 coromandeliama, Linn. 469 servistipula (semistipula) 16ternata, Rosb. 569 coromandeliama, Linn. 469 servistipula (semistipula) 17 18 coromandeliama, Koen. 502 servinuica, Linn. 460 servistipula	Muncipus, Wall					
Myrete.e.						
Myrtus acuminatissima, Bl. ii. 483					•••	
amboinensis, Rumph.						
scristipula (semistipula) scristipula (semistipula) brazitana, Linn. 502 Balb. 569 brazitana, Linn. 502 Balb. 569 spruosa, Ham. 560 canescens, Lour. 469 tenuis, A. Br. 570	Landar and Dane Land					
bracteata, Willd.						000
hraziliana, Linn.		• • • • • • • • • • • • • • • • • • • •			•	569
Canescens, Lour.				1 77_	• • • • • • • • • • • • • • • • • • • •	
Carryophyllata, Linn.						
Nama seylanica, Linn. 134						
sp. Linn.						
Coromandeliana, Koen.						
cotinifolia, Spreng. , 501 Ritchieans, H. Wdl. , 429 Cumini, Linn. , 499 Nanothamnus, Thoms. iii. 273 cymosa, Bl. , 496 Narothamnus, Thoms. ; 273 cymosa, Spreng. , 482 Rericeus, Thoms. , 273 densiflora, Bl. , 473 Rericeus, Thoms. , 273 heynei, Spreng. , 502 Jautfolia, Heyne , 502 laurina, Retz. ini. 573 Nardostachys, DC. iii. 210 grandifora, Bl. , 473 Nardostachys, DC. iii. 210 grandifora, Bl. , 473 Nardostachys, DC. iii. 210 latifolia, Heyne , 502 malactensis, Bl. , 487 litteradis, Roxb. , 502 malaccensis, Bl. , 487 litteradis, Roxb. , 502 malaccensis, Spreng. , 472 malaccensis, Spreng. , 472 malaccensis, Spreng. , 472 malaccensis, Spreng. , 472 marcidensis, Fries , 356 smilactfolia, Wall. , 468 stricta, Linn. , 366				Nannorhons H Wdl.		
Cumini, Linn	cotinifolia Surena					
cymosa, Bl , 496 cymosa, Spreng , 482 densiftora, Bl , 473 Heynet, Spreng , 502 Jambos, Kunth , 474 javanica, Bl , 473 latifolia, Heyne , 502 laurina, Retz iii. 573 Leucadendron, Linn iii. 465 lineatas, Bl , 487 Littoralis, Roxb , 502 macrophylla, Spreng , 472 malaccensis, Spreng , 472 quadrangularis, Ham , 485 smilacifolia, Wall , 386 smilacifolia, Wall , 386 smilacifolia, Wall , 487 littoralis, Roxb , 502 malaccensis, Spreng , 472 quadrangularis, Ham , 486 smilacifolia, Wall , 485 smilacifolia, Wall , 485 smilacifolia, Wall , 485 spicata, Ham , 502 trinervia, Sm , 469 mayropyrum, Bl , 618 myxopyrum, Bl , 618 montanum, Wall. , 134 heterophyllum, D. Don , 133 indicum, DC , 134 heterophyllum, D. Don , 133 indicum, DC , 134 heterophyllum, Bl , 134 heterophyllum, D. Don , 133 indicum, DC , 134 heterophyllum, D. Don , 134 heterophyllum, Bl						
Cymosa, Spreng.		•••			•	
densiftora, Bl.					1.	
Heynei, Spreng.		• • • • • • • • • • • • • • • • • • • •		77') 127 11	-	
Jambos, Kunth		•				
javanica, Bl			474			7
latifolia, Heyne	TO 1	••	2.0			
Leucadendron, Linn.		•••				
Leucadendron, Linn.		* 13	573			211
		••				
macrophylla, Spreng. , 472 Mardus indica, Blane vii. 203 malaccensis, Spreng. , 472 indica, Linn.f. , 283 quadrangularis, Ham. , 486 stricta, Linn. , 366 rascifolia, Willd. ii. 486, 502 Thomæa, Linn.f. , 366 saligna, Gmel. , 465 Thomæa, Linn.f. , 366 soneratii, Spreng. , 465 Soneratii, Spreng. , 465 spicata, Ham. , 502 Nargedia, Bedd. iii. 122 tomentosa, Ait. , 469 Margedia, Bedd. iii. 122 macrocarpa, Bedd. , 122 Narthecike. vi. 301 Nargedia, Falc. iii. 707 Asafatida, Falc. , 707 Mystacidium, Lindl. vi. 78 Asafatida, Falc. , 707 Nasturtium, Br. ii. 33 heterophyllum, Bl. , 134 nervosum, Bl. , 618 mottanum, Wall. , 134 Mysospermum chylocarp , 618 mottanum, Wall. , 134 Mysospermum chylocarp , 597 , 597 , 138 Idi			502			356
malaccensis, Spreng.						
stricta, Linn						
Tuscifolia, Willd.			486	1 4 4 T *		366
Saligna, Gmel. 3465 Saregamia, W. & A. i. 542 Sanitacifolia, Wall. 3468 Soneratii, Spreng. 3455 spicata, Ham. 502 tomentosa, Ait. 3469 trinervia, Sm. 3460 trinervia, Sm			502			366
Smilacifolia, Wall						542
Soneratii, Spreng			468		. ,,	542
Spicata, Ham.	o i o'		485			542
tomentosa, Ait , 469 trinervia, Sm , 468 zeylanica, Linn , 485 Mystaoidium, Lindl. vi. 78 Mystaoidium, Lindl. vi. 78 Mystapyrum, Bl , 618 meterophyllum, Bl , 618 smilaoifolium, Bl , 618 Mysospermum chylocarp m. Roem i. 500 japonica, Gaertn , 597 latifolia, Gord , 649 Nalabacez vi. 562 Nalabacez vi. 562 Nalabacez vi. 568 dichotoma, Roxb , 569 macrooarps, Bedd , 122 Narthez Falc ii. 307 Asatheciz vi. 307 Asatheciz ii. 707 Asafatida, Falc , 133 heterophyllum, Bl , 134 heterophyllum, Bl , 134 madagascariense, W. & A. , 134 montanum, Wall , 134 officinale, Br , 133 latifolia, Gord , 649 Thouarsii, Spreng , 133 Nataistum, Ham i. 595 gamosepalum, Griff , 595			502			122
Narthex, Falc.		,,	469	macrocarpa, Bedd	. ,,	122
	trinervia, Sm	,,	468		vi.	301
Mystacidium, Lindl. vi. 78 Asafætida, Falc. , 707 zeylanicum, Trim. , 78 Nasturtium, Br.	zeylanica, Linn		485	Narthex, Falc	. ii.	707
Myxopyrum, Bl. iii. 617 heterophyllum, Bl. , 134 nervosum, Bl. , 618 heterophyllum, D. Don , 184 smilacifolium, Bl. , 618 indicum, DC. , 184 Mysospermum chylocarp m. , 618 madagascariense, W. & A. , 184 Rœm. . i. 500 montanum, Wall. , 184 officinale, Br. . , 183 paponica, Gaertn. , 597 terrestre, Br. , 183 latifolia, Gord. , 649 Nastus baccifera, Roxb. vii. 417 Putranjiva, Roxb. , vi. 562 Thouarsii, Spreng. , 392 Naias, Lins. vi. 562 Natsistum, Ham. i. 595 dichotoma, Roxb. , 569 gamosepalum, Griff. , 595	Mystacidium, Lindl				. ,,	
Naias, Linn. Naia					. 1.	
Smilacifolium, Bl , 618 Indicum, DC , 184	Myxopyrum, Bl	iii.			,	
Mysospermum chylocarp m. madagascariense W. & A. 184 Roem. i. 500 montanum Wall. , 184 Nageia bracteata Kurz. v. 650 palustre DC. , 183 japonica Gaertn. , 597 terrestre Br. , 183 latifolia Gord. , 649 Nastus baccifera Roxb. vii. 417 Putranjiva Naladacez vi. 562 Thouarsii Spreng , 392 Naias Lins. vi. 562 Natsistum Ham. i. 595 dichotoma Roxb. , 569 gamosepalum , 576	nervosum, Bl	,,			. 29	
Roem i. 500 montanum, Wall 184 officinale, Br 183 Nageia bracteata, Kurz. v. 650 palustre, DC 183 palustre, DC 183 latifolia, Gord 649 Nastus baccifera, Roxb. vi. 417 Putranjiva, Roxb vi. 562 Thouarsii, Spreng 392 Naisa, Lins vi. 568 dichotoma, Roxb 569 gamosepalum, Griff 595 569 gamosepalum, Griff 595 569 gamosepalum, Griff 595 569 gamosepalum, Griff 595 569		,,	618	indicum, DC	. ,,	
Officinale, Br	Myrospermum chylocarp &	п,			. ,,	
Nageia bracteata, Kurz. v. 650 palustre, DC. " 183 japonica, Gaertn. " 597 terrestre, Br. " 183 latifolia, Gord. " 649 Nastus baccifera, Roxb. vii. 417 Putranjiva, Roxb. " 337 Thouarsii, Spreng. " 392 Naladacez. vi. 562 Tjangkorreh, Schult. " 415 Naias, Linz. vi. 568 Natsiatum, Ham. i. 595 dickotoma, Roxb. " 569 gamosepalum, Griff. " 595	Roem	1.	500		. ,,	
japonica, Gaertn. ", 597 terrestre, Br. ", 183 latifolia, Gord. ", 649 Nastus baccifera, Roxb. vii. 417 Putranjiva, Boxb. ", 337 Thouarsii, Spreng. ", 392 Naladace. vi. 562 Tjangkorreh. Schult. ", 416 Naias, Lins. vi. 568 Natsiatum, Ham. i. 595 dickotoma, Roxb. ", 569 gamosepalum, Griff. ", 595	37		050		,,,	
Latifolia, Gord , 649 Nastus baccifera, Roxb vii. 417					. ,,	
Putranjiva, Roxb. <td></td> <td> ,,</td> <td></td> <td></td> <td>٠.</td> <td></td>		,,			٠.	
NAIADACEÆ vi. 562 Tjangkorreh, Schult. 415 Naias, Linn. vi. 568 Natsiatum, Ham. i. 595 dichotoma, Rozb. ,, 569 gamosepalum, Griff. ,, 595		,,		m		
Naias, Linz vi. 568 Natsiatum, Ham				l m		
dichotoma, Rozb ,, 569 gamosepalum, Griff ,, 595	NAIADACEE				•	
f-1-1-1-1- 4 D	1.1.					
Taiciculata, A. Braun ,, 509 Derpeticum, Ham ,, 595	8-1-1-1-1-A D.			1 1 17		
	imioiculata, A. Braun .	,,	อดค	nerperioum, nam	. ,,	991)

NT. 4 5 . 4		_	•		_
Natsiatum		Page	1 37		Page
herpeticum, Ham	vii.	595	Neerija dichotoma, Roxb	į.	623
oppositifolium, Pl	. 17	596	Neesia, Bl	i.	352
sp., Griff		595	altissima, Bl	2)	352
Naucles, Linn	111.	26	synandra, Mast	. ".	352
acida, Hunter	. ,,	33		Add	end.
aralioides, Miq	٠,,	25	rubiflora, D. Don ,,	,,	
Brunonis, Wall	. ,,	26	thyrsiflors, D. Don "	,,	
Cadamba, Roxb	٠,,	23	rirgata, Wall ,,	, ,,	
coadunata, Roxb	,,	22	Nelitris Jambosella, Gaertn.	iii.	127
cordata, Roxb	. ,,	22	pallescens, Miq	ii.	470
cordifolia, Willd		24	paniculata, Lindl	"	470
diversifolia, Wall		26	polygama, Spreng	,,	470
elliptica, Dalz. & Gibs		27	polymorpha, Bl	17	470
excelsa, Bl		27	Nelsonia, R. Br	iv.	394
ferrea, Bl		33	campestris, Br	,,	394
ferruginea, Bl	-	28	canescens, Nees	••	394
? Gambier, Hunter		31	lamiifolia, Spreng	,,	394
lunceolata, Bl	••	26	origanoides, R. & S		394
lanosa, Poir		33	senegalensis, Oerst	"	395
Maingayi, Hk. f	• • •	27	Smithii, Oerst	,,	395
1 107-11	"	25	4	,,	394
777 17	"	27	1 11 11 11	"	395
	"	27	1	"	395
oblonga, Miq		24	villosa, Oerst	:"	388
occidentalis, Linu			Nelsonie	ıv.	
orientalis, Hb. Madr	.,	27	NELUMBIEE	į.	113
orientalis, Lamk	"	28	Nelumbium, Juss	i.	115
ovalifolia, Roxb	"	27	asiaticum, Rich	"	116
parvillora, Pers	" "	25	speciosum Willd	"	116
parvifolia, Wall	"	22	Nelumbo indica, Poir	i.	116
parvifolia, Willd	"	25	Nematopyxis fruticulosa, Miq.	ii.	588
peduncularis, Wall	**	27	prostrata Miq	11	588
peduncularis, Thw	17	26	pusilla, Miq	"	588
polycephala, Wall	"	25	Nemedra Nimmonii, Dalz	. i.	56L
purpurea, Koxb	"	26	Nemodon sp., Griff	iv.	216
purpurca, Wall	"	22	Nonga, H. Wendl. & Drude	Vì.	412
rotundifolia, Roxb	,,	26	gracilis, Becc	"	407
Roxburghii, G. Don	"	22	macrocarpa, Scort	"	412
scandens, Roxb	"	30	pumila, Wendl	"	412
scandens, Sm	"	32	Wendlandiana, Scheff	17	412
sclerophylla, Hunter	"	28	Nengella paradoxa, Becc	VI.	411
sericea, Wall	,,	24		103,	
sessilijolia, Roxb	,,	24	amæna, Bieb	٧i.	102
setigera, Bl	,,	33	australis, Br	,;	102
stipulacea, Roxb	"	22	crispata, Bl	,,	102
tetrandra, Roxb	"	24	flexuosa, Sm	;;	102
trichotoma, Zoll. & Mor	,,	25	Lindleyana, Done	17	103
tubulosa, Arn	,,	25	listeroides, Lindl	,,	103
undulata, Roxb	,,	22	macrophulla, D. Don	17	130
undulata, Wall		22	monophylla, D. Don	,,	131
Wallichiana, Br	,,	22	parviflora, Sm	u	102
zeylanica, $Hk.f.$	"	26	plantaginea, D. Don	11	181
NAUCLEEÆ	iii. 17		procera, Ker	,,	111
Nechamandra alternifolia, Th	w. v.		sinensis, Pers	,,	102
Roxburghii, Planch	,,	659	strateumatica, Br	,,	103
Nectandra decandra, Roxb.		198	viridiflora, Bl	"	96
Nectarobothrium striatum,			NEOTTIEÆ v. 668, 673,	vi.	88
Ledeb	vi.	354	NEPENTHACEÆ	٧.	68

•		_	1 37	
		Page		l. Page
	v.	68	multifida, Linn iv	
albo-marginata, L o bb .	,,	70	nepalensis, Spreng ,,	
ampullacea, Bl	,,	69	nervosa, Royle ,	658
ampullaria, Jack	,,	6 9	nivalis, Benth ,,	ec i
At Atlantanta I tour	,,	68	polystachya, Benth	REQ
J. L. 11 A 1 387 11		70	raphanorhiza, Benth	ara.
	•• ,,	69	7'6 1'- 1341	CHO
	,,	71		861
	,,		ruderalis, Ham ,	662
	,,	69	ruderalis, Boiss ,,	
indica, Poir	,,	68	Sabinei, T. A. Schm ,	659
khasiana, $Hk.f.$,,	70	salviæfolia, Royle ,	664
Korthalsiana, Miq	,,	71	secunda, Wall ' ,	, 661
lævis, Korth	,,	71	spicata, Benth ,,	ara
	••	69	supina, Ster ,,	850
3 13 3 177 777 7	••	69	Mhomeouri Douth	659
	n ′′	70	1 11 11 11 11	66.1
		69		679
	,,		versicolor, Trevir ,,	000
	,,	70	sp., Hk. f. & T ,,	
sanguinea, Lindl	,,	70	Nephelaphyllum, Bl v. 818,	r. 606
sanguinea, Griff	,,	70	Nephelaphyllum, Bl v. 818, v	ri. 192
4 4 - 11 - Mi	,,	70	cordifolium, Lindl v	818
No. of the Property of the Control o	iv.	656		i. 192
Total Color Comment		672	nudum, Hk. f ,,	
	,,	657	pulchrum, Bl v	
	,,	657	tonniforum DI = 910 =	
	,,		tenuiflorum, Bl v. 819,	606
	,,	661	Nephelium, Linn i	. 686
	,,	657	bengalense, G. Don	689
calaminithodes, Benth. i	v. 661,		bifoliolatum, Thw i. 68	4, 690
campestrie, Benth	iv.	658	costatum, Hiern i	. 688
campestris, Hk. f. & T.	,,	658	dimocarpus, Hk. f. & T ,	688
O	,,	662	duriocarpus, T. And ,	600
-2122 - 70 41		661	echinatum, Noronh ,	687
~ 1 · 771 ·		663		3, 690
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,,	661	eriopetalum, Miq i	
	•• ,,			0, 691
	,,	657	eximium, Thw i. 69	0,031
	,,	659		2, 690
	,,	660	Gardneri, Thw i	
disticha, Bl	,,	672	glabrum, Noronh	
elliptica, Royle	,,	658	Griffithianum, Kurz ,,	687
erecta, Benth	,,	663	hypoleucum, Kurz ,,	689
eriostachya, Benth	,,	657	lappaceum, Linn ,,	687
1''6.1' Duine	,,	667		5, 687
Acces Danish	.,	662	Longana, Camb. i. 679, 68	
1 1 1 1		660		. 688
% · ` n	•• ,,	663		600
	,,			600
	,,	663	mora, Gardn "	
	,,	683	mutabile, Bl	
	,,	672		6, 690
lamiopsis, Benth	,,	659	pupillum, Wight i.	
1 1	,,	662	rimosum, G. Don "	690
1	,,	662	rubescens, Hiern ,,	688
3		657		1, 691
	•• ,,	660		3, 691
	,,	663		690
macrantha, Led				
madagascariensis, Lamk.	Р,,	624	variabile, Wall	691
	•• ,,	673	verticillatum, G. Don i. 68	
mollis, Benth	. ,,	660	erocarpum, Camb ,, 68	6, 691

Vol. Page	Neurocalyx	Vol.	Page
Nephelochloa altaica, Griseb. vii. 338	Hookeriana, Wight		
persica, Griseb ,, 337	Wightii, Arn		47
soongarica, Griseb ,, 338	zeylanica, Hook		47
tripolitana, Boiss. & Blanch. ,, 338	Neurocarpum cajanafolium		
Nephrocælium malaccense, Turcz v. 665			209
** - · · · · · · · · · · · · · · · · · ·	1		209
			200
-1 T 00F	Neuroloma (Neurotoma)	•	131
oleracea, Lour ,, 285	nudicaule, DC		
plena, Benth , 286	scapigerum, DC		131
triquetra, Benth , 286	Neuropeltis, Wall	. iv.	224
Nerium, Linn iii. 654	bracteata, Griff	,,,	225
antidysentericum, Linn ,, 654	intermedia, Griff	, ,,	225
caudatum, Lamk ,, 655	orata, Wall	. ,,	225
caudatum, Roxb ,, 656	racemora, Wall	,,	2 25
coccineum, Roxb ,, 654	Neustanthus javanicus, Benth	. ii.	199
Coraia, Ham ,, 653	peduncularis, Benth	,,,	197
coronarium, Jacq ,, 647	phaseolvides, Bonth		199
divaricatum, Hb. Madr " 654	sericans, Mig		199
divaricatum, Linn ,, 647	subspicatus, Benth	-	199
grandistorum, Roxb iv. 6	Neuwiedia, Bl		175
indicum, Mill iii. 655	Curtisii, Rolfe		175
latifaliam Mill QEE	O 100 1 11 11 11 1		176
odoratum, Lamk , 655			175
-3 G-13 CEE	Lindleyi, Rolfe		
	Neyraudia, Hk. f vii.		
pauciflorum, Roxb iv. 6	madagascariensis, Hk. f.		
Piscidium, Hort. Cale ,, 46	Nicandra, Adans	iv.	210
Piscidium, Roxb iii. 629	anomala, Link & Otto	"	243
reticulatum, Roxb iv. 5	indica, R. & S	,,	238
scandens, Lour iii. 655	physaloides, Gaerin	"	240
P tinctorium, Ham ,, 653	Nicolsonia, DC	ıi.	170
tinctorium, Roxb ,, 653	congesta, Wight	,,	152
tomentosum, Roxb ,, 653	reptans, Meissn	,,	173
zeylanicum, Linn ,, 654	Nicotiana, Linn	iv.	245
Nervilia Aragoana, Gaud vi. 121	crispa, Pers	,,	246
Nesæa triffora, Kunth ii. 565	plumbaginifolia, Viv	"	246
Neslia, Desv i. 164	rustica, Linn	"	245
paniculata, Desr, 164	Tabacum, Linn	"	245
Neubeckia decora, Klatt vi. 274	Nictanthes, vide Nyctanthes		
	Niebuhria, DC	i.	171
Neuracanthus, Necs iv. 490	arenaria, DC	"	171
101	linearis, DC		171
Lauri Winha 401		"	171
Massianna Claulta 401	oblongifolia, Royle	17	171
ambananta abana Dala " 401	Nima quassioiles, Ham. mss.	i.	520
**************** 7 ***** * *10			567
	Nimmonia Koribunda, Wight.		561
tetragonostachyus, Nees ,, 491	Lawii, Wight	1.	
tetragonostachyus, Wall " 528	Niota Lamarkiana, Bl	i.	519
trinervius, Wight ,, 491	lucida, Wall	"	519
sp., Kew Distrib ,, 491	pentapetala, Poir	"	519
Neurachne Meneritana, R. & S. vii. 25	? polyandra, Ham	19	517
Neurada, Linn ii. 368	tetrapetala, Lamk	"	519
procumbens, Linn " 368	Nipa, Wurmb	VI.	424
NEURADEÆ ii. 308	fruticans, Wurmb	19	424
Neurocalyx, Hook iii. 46	Nirbisia, G. Don	i.	27
Neurocalyx, Hook iii. 46 capitata, Benth ,, 47		iii.	302
Championii, Benth ,, 47	Nolina ? javanica, Has-k		
Gardneri, Thw 47	Nomaphila, Bl		409

Nomaphila Vol. Page	Nyctanthes Vol. Page
corymbosa, Bl iv. 409	hirsuta, Linn iii. 126, 592
Parishii, T. Anders ,, 409	multiflora, Burm iii. 592
pinnatafida, Dalz ,, 405	pubescens, Retz " 592
pubescens, Kurz ,, 409	Sambac, Linn ,, 591
striota, Nees ,. 408	scandens, Retz ,, 595
Nomismia aurea, W. & A ii. 221	triflora, Burm ,, 598
capitata, W. & A ,, 221	undulata, Linn " 591
nummularia, W. & A ,, 221	viminea, Retz ,, 598
Nonatelia ? hispida, Wall iii. 180	Nyctocalos, Teysm. & Binn. iv. 376
Nonnea, Moench iv. 169	Thomsoni, Hk. f ,, 377
Edgeworthii, A. DC , 169	Nymphæa, Linn i. 114
pulla, Lamk ,, 169 taurica, Ledeb ,, 169	alba, Linn ,, 114
taurica, Ledeb	cachemiriana, Camb , 114
Norrisia, Gardn iv. 85	Descripancia Hools 114
	Todania della labora 111
Nortenia Thouarsii (Thomassii)	adailia DC " 114
Cham. & Schl iv. 278	Hookamana Lahm 114
Notelæa Posua, D. Don iii. 611	Lotus Linn 114
Zollingeriana, Teijs. & Binn ,, 612	Aralamaka Timm " 110
Nothaphæbe? petiolaris,	punctata, Edgw ,, 114
Meissn v. 145	pubescens, Willd ,, 114
umbelliflora, Bl ,, 145	pygmæa, Ait " 115
Nothocnesti: sumatrana, Miq. i. 622	rubra, Roxb ,, 114
Notholirion macrophyllum,	sagittata, Edgew ,, 114
Boiss vi. 352	stellata, Willd ,, 114
roseum, Wall ,, 352	versicolor, Roxb ,, 114
Nothopanax fruticosum, Miq. ii. 725	NYMPHÆACEÆ i. 113
? pinnatum, Miq ,, 734	Nymphanthus Niruti, Lour. v. 298
tricochleatum, Miq ,, 727	NYMPHEÆ i. 113
Nothopegia, $Bl.$ ii. 39	Nyssa, Linn ii. 747
aureo-fulva, Bedd ,, 40	sessiliflors, Hk. f ,, 747
Colebrookiana, Bl., ,, 40	0
travancorica, Bedd ,, 40	Oberonia, Lindl v. 675
Nothosærua, Wight iv. 726	acaulis, Griff ,, 679
brachiata, Wight ,, 726 Nothoscordium Sulvia, Kunth vi. 337	acaulis, Hook ,, 679
	anceps, Lindl ,, 685 angustifolia, Lindl. v. 684, vi. 181
T 140	
7.0	Annettiene Winha COO
Notochæte, Benth iv. 694	histornia Tandi 600
hamosa, Benth ,, 694	brachystachys, Lindl ,, 677
Notonia, DC iii. 337	Browneana, Thw ,, 680
balsamica, Dalz. & Gibs. , 337	Brunoniana, Wight ,, 681
corymbosa, DC ,, 337	caulescens, Lindl. v. 682, vi. 181
crassissima, DC ,, 338	ciliolata, Hk. f vi. 181
crassissima, Schultz ,, 337	cimicina, Griff v. 676
grandiflora, DC ,, 337	Clarkei, Hk. f ,, 676
Walkeri, Clarke ,, 337	demissa, Lindl ,, 680
Notonia, W. & A ii.	denticulata, Wight ,, 676
Wightis, W. & A ,, 183	ensiformis, Lindl ,, 679
Notothixos, Oliv v. 227	Falconeri, Hk. f. v. 678, vi. 180
floccosus, Oliv ,, 227	ferruginea, Par v. 679
NYCTAGINEZ iv. 708	flexuosa, Par ,, 676
Nyctanthes, Linn iii. 603	forcipata, Lindl ,, 681
angustifolia, Linn ,, 598	Gardneriana, Thw ,, 686
Arbor-tristis, Linn ,, 603	gracilis, Hk. f ,, 685

Obero: ia	Val	Dama	Ochna	•	Vol	Page
Griffithiana, Lindl. v.	676. vi	Page . 180	? brevipes, Planch		i.	525
Griffithii, Wight	v.		collina, Edgew	•••	,,	524
Helferi, Hk. f	,,	679	cordata, Thw		,,	524
imbricata, Wight	,,	685	crocea, Griff		,,	525
insectifora, Hk. f	vi.	180	fruticulosa, Kuvz		,,	524
iridifolia, Lindl. v.	675, vi	. 180	Heyneana, W. & A	•••	"	524
iridifolia, Wall	▼. 678		humilis, Wall	•••	,,	524
Jenkinsiana, Griff	v.		lucida, Lamk	•••	**	528
Lindleyana, Wight	••• ,,	681	Moonii, Thw	•••	**	524
longibracteata, Lindl.	,,	678	nana, Ham	•••	"	524 523
longibracteate, Thw.	,,	680	mitida, Thunb	•••	"	524
lunata, Lindl	vi.	. 180 180	nitida, Wall	•••	"	528
Mannii, $Hk. f. \dots \dots$ maxima, $Par. \dots \dots$	y.	677	obtusata, DC	•••	"	524
maxima, Par miniata, Lindl		685	parviflora, Griff parvifolia, Vahl?	•••	"	524
Myosurus, Lindl	••• ,,	685	pumila, Ham	•••	," "	524
myriantha, Lindl	,,	679	rufescens, Thunb.?		"	528
obcordata, Lindl	,,	684	squarrosa, Linn		"	528
orbicularis, Hk. f	*** ,,	677	squarrosa, Kurz	•••	,,	524
pachyrachis, Rchb. f. v.		. 181	stipulacea, ? Colebr	•••	,,	524
platycaulon, Wight	v.	682	Walkerii, Planch		"	524
platycaulon, Thw	,,	686	Wallichi, Planch		"	524
pyrulifera, Lindl	,,	678	Wightians, Wall	•••	"	524
	680, vi		seylanica, Lamk	•••	27	525
rosea, Hk. f	vi.	180	OCHNACEE	•••	i.	528
rufilabris, Lindl	▼.	683	OCHNEE	•••	i.	528
Scortechini, Hk. f	*** ;;	683	Ochradenus, Del	•••	i.	182 182
Scyllæ, Lindl	,,	684	baccatus, Del	•••	"	270
setifera, Lindl	,,	680 679	Ochrocarpus, Thouars	ı	i.	270
sikkimensis, Lindl spiralis, Griff	,,	686	longifolius, Benth. & H siamensis, T. Anders.	-	99	270
spiralis, Grin stachyoides, A. Rich.	;	643	Ochrosia, Juss	•••	iii.	638
tenuis, Lindl	,,	682	borbonica, Gmel	•••	"	688
Thwaitesii, Hk. f	,,	678	salubris, Bl		"	688
Treutleri, Hk. f	,,	683	Ochthocharis, Bl	•••	ii.	528
trilobata, Griff	,,	679	javanica, Bl	•••	,,	528
truncata, Lindl	,,	677	paniculata, Korth		,,	528
verticillata, Wight	,,	677	Ochthocloa dactyloides, Ko	gew		
Wallichii, Hk. f	,,	681	Outmoide#		iv.	
Wightians, Lindl	,,	683	Ocimum, Linn	•••	iv.	
zeylanica, Hk . f	,,	680	acrocophalum, Bl	•••	"	611
Obione Belangeri, Moq.	▼.	7	adscendens, Willd	•••	99	609
Koenigii, Moq	,,	7	adscendens, Wight	•••	19	614 608
nummularia, Moq	,,	7	album, Linn	•••	"	607
Stocksii, Wight	,,	7 576	album, Roxb	•••	99	608
Ochanostachys, Mast.	1.	577	americanum, Jaoq americanum, Linn	•••	23	607
ochlandra, Thw	vii.	418	asperum, Roth	•••	"	625
Beddomei, Gamble		419	Barrelieri, Roth	•••	"	608
Brandisii, Gamble	••	420	Basilicum, Linn		"	603
Rheedii, Benth	,,	418	bullatum, Lamk		",,	606
Ridleyi, Gamble	,,	420	canum, Sims	•••	"	607
setigera, Gamble	,,	420	capitatum, Roth		"	611
stridula, 7 hw	,,	419	capitellatum, Linn. f.		"	611
travancorica, Benth.	*** "	419	caryophyllatum, Boxb.	•••	77	608
Ochna, Linn	i.	528	Chandra, Ham	•••	"	611
andamanica, Kurs	11	524	ciliare, Heyne	•••	"	608
VOL. VII			•		T	

Ocimum	٧	l. Page	Ocimum	Vol	. Page
ciliatum, Hornem		v. 608	urticafolium, Roth	iv.	
cinereum, Br		,, 625	verticillatum, Heyne	••• ,,	609
		,, 608	villosum, Roxb	,,	609
Costsa, Spreng		,, 620	virgatum, Ham		615
cordifolium, Herb. Mad		614	? Zatarhendi, Forsk.	*** ;;	625
	v. 6	08, 609	Ocotea attenuata, Nees		143
donoido D. 17		v. 624	declinata, Bl		142
2 difference DomAl		, 613	glaucescens, Nees	*** ;;	140
fastiniatum Dash		, 656	1	*** ,,	141
Aganidam A Diak		611	72	,,	142
foutagana [in-		" 616	ligustrina, Str. & W.	••• ,,	
alaucum Hanne	•	014	mallida Niasa	,,	140
aran did one m D1		415		,,	142
Orotionimam Time	•	600	paniculata, Nees	,,	143
himeartary Donah	•	800	pubescens, Nees	••• ,,	142
hamandarus W7-11	,	619	sericea, Nees	••• ,,	139
hiomidam. I amb	٠. ,	, G'O	umbellifera, Nees	,,	145
indiana Dash	,	,	Octarrhena parcula, Thwo		811
in a dame D	,		Octomeria alba, Wall	▼.	795
	,	, 609	convallarioides, Wall.	,,	791
integerrimum, Willd.	•• ,		excavata, Wall	,,	795
7 4	٠. ,		flava, Wall	,,	801
	۰۰ ٫۱		pubescens, Spreng	,,	801
	٠. ,		secunda, Wall	,,	791
mayporense, Roth	,		spicata, D. Don	,,	791
medium, Mill	•• ,		Octotropie, Bedd	iii.	131
menthæfolium, Benth.	. ,,		travancorica, Bedd.	,,	131
menthafolium, Hochst	٠. ,.		Odina, Roxb	iı.	29
menthoides, Burm	•• ,;		Wodier, Roxb	,,	29
minimum, Linn	٠,,		Odonia trinervia, Spreng.	iı.	212
minimum, Burm	. ,,			iv.	/Ł
Miria, Ham	. ,,		Odontites rubra, Benth.	iv.	305
molle, Ait	٠,,		serotina, Boiss	,,	305
mollissimum, Wall	. ,,	615	Odontochilus, Bl	vı. 98,	179
monachorum, Linn	٠,,		h:-41:- 7/1 C	vi. ̇́	100
monadelphum, Roth	٠,,		calcaratus, Hk. f	,,	99
petiolare, Miquel	. ,,	614		,,	100
pilosum, Willd	٠,,	603	orispus, Hk. f	••• ,,	99
polystachyum, Linn	. ,,	612	Telmonii Alauka	,,	100
prostratum, Linn	. ,,	610	flavus, Benth	••• ,,	101
rigidum, Ham	. ,,	615	amandifforce Daniel	,,	100
robustum, Heyne	٠,,	608	lanceolatus, Benth	,,	101
rubicundum, Ham	. ,,	615	manage Alexander	"	98
saccharoides, Willd	. ,,	625	pectinatus, Hk. f	,,	99
sanotum, Linn	. ,,	609	pumilus, Hk. f		99
scabrum, Wight	٠,,	608	Odontostemma (lapsu Alen	n-	
scutellarioides, Linn	. ,,	626	stemma) glandulosus	n.	
suave, Willd	. ,,	609	Benth	i.	242
subserratum, Heyne	. ,,	609	Œceoclades flexuosa, Lindl.	₹i.	72
tenuiflorum, Burm		612	paniculata, Lindl	,,	58
tenuistorum, Heyne		610	pusilla, Lindl	,,	57
tenuistorum, Linn		609		•• •	87
ternifolium, Spreng		621	tenera, Lindl		73
? thymistorum, Roth		614	Edipachne punctata, Link	∵ vii.	21
thyrsiflorum, Linn	. ,,	608	Conanthe, Lins,		595
trists, Roth, lapsu Ortho-	•	- 1	benghalensis, Benth		396
siphon		618	corticata, Edgew		i96
tuberosum, Rozb		615	field loom I imm		397
				"" "	•

				
Cenanthe Vol. Pa				ol. Page
	7 graminifolia, DC.	•••	i	ii. 69
	16 herbacea, DC		•••	,, 64
laciniata, Miq ,, 6	6 herbacea, Willd.	•••		,, 63
	Heynei, Hk. f			" 6 5
etalonifous Wall	6 hirsuta, Lina. of.			. 63
Themani Claube 6	hispida, Banth.			~ e1
		•••	•••	" 71
	,	• •••	•••	,,
	32 japonica, Miq		•••	,, 63
	lactea, Cham. &		•••	,, 71
Eonia? alata, A. Rich vi.	3 linarifolia, Hb. M	adr.		,, 67
Oianthus, Benth iv.	18 ? linearis, DC			,, 65
	9 linifolia, DC			65, 69
	9 maritima, Roth		_	v. 287
manalatan Dauth	9 multiflora, Cav.			ii, 69
				73
Oiospermum? Metzianum,	mysurensis, G. Do		••	" 70
Schultz, lapsu Diosper-	nudicaulis, Roth		•••	,,
mum • iii. 2:			•••	,, 70
Wightianum, DC ,, 3	01 oxyphylla, G. Do	a	•••	,, 73
	3 paniculata, Linn.		,	, 69
	2 paniculata, Roxb			, 70.
01 7:				70
				" 7.
,, ,,				, .
	5 puberula, G. Don	•••	••	,, 66
Heyneana, Wall i. 576, 5			•••	,, 65
imbricata, Roxb i. 5	'5 pusilla, Roth		• • •	,, 67
longifolia, Wall i. 576, 5				,, 69
lucida, Heyne i. 5	5 rainosa, Rozb			,, 64
merguensis, Planch ,, 5'				,, 69
777 11 2 580 222 01				" 88
				49
				68
scandens, Roxb ,, 5			••	,,
Psumatrana, Miq ,, 58			•••	,, 70
Wightiana, Wall. i. 575, v. 2	3 rubioides, Miq	•••	••	, 57
zeylanica, Linn i. b'	6 scabrida, DC			,, 64
zeylanica, Wall ,, 5	5 ? senegalensis, H	iern .		,, 68
	4 Shuteri, Hk. f			, 69
-#:- DO	7 spergulacea, DC.			, 70
	O Stocksii, Hk. f.			07
				60
adata, zecasi iii iii iii iii				75
4000.00, ,,	1 Teysmaniana, Mic			"
ang 200 y , , ,	O trinorvia, Retz	•••	••	, 66
	7 umbellata, Linn.	•••	••	, 66
aspera, DC ,,	8 Wightii, Hk. f.		;	, 66
asperula, DC ,.	5 Oles, Linn		, i	ii. 611
3.974	0 apetala, Vahl			, 618
	attenuata, Wall.			,, 611
	6 clavata, G. Don			RIE
Diacatata, Est. J.				" 616
or doing pour y = or	5 compacta, Wall.			,,
	l cuspidata, Wall.			,, 611
	9 dentata, Wall	•••	•••	,, 613
corymbosa, Linn ,,	dioica, Rozb		•••	,, 612
crystallina, Rosb ,,	5 ferruginea, Royle			,, 611
4 7 WEST 4	1 fragrans, Thunb.			, , 606
31.3.4	7 Gamblei, Clarke			" 412
	5 Gardneri, Thw			" 419
41224, 200201 111 111 111 111				" 619
digyna, Retz ii 8			• • •	017
gracilia, Hk. f iii.	18 l. gran distora, W a ll.	•••	• • •	,, 617

Ules	Vol.	Da	•	Vol.	Do as
	iii.		Onosma, Linn	iv.	177
77 . 32 . 1 337 . 31		616	arenarium, Waldst. & Kit.		178
	"	608	1.7. 3 727.77	,,	179
	•• ,,	612		"	178
	,,	613	1.1.1.1. T.1	••	178
microcarpa, Vahl	•• ,,	609	TO 3: 177 - 17	"	179
paniculata, Roxb	,,		Emodi, Wall	"	
	,,	609	Emodi, Wall. Cat	"	179
	,,	618	Gmelini, Ledeb	"	178
robusta, Wall	,,	614	hispida, Wall	"	178
		609	Hookeri, Clarke	"	178
	i. 609,		macrocephalum, D. Don	"	178
	iii.	615	Thomsoni, Clarke	"	178
	,,	618	vestitum, Wall	,,	179
	,,	610	Wallichianum, Benth	"	179
	,,	612	sp., Hk. f. & T		178
sp., Griff	,,	614	Onychium crumenatum, Bl.	٧.	729
OLEACEÆ	iii.	59 0	lamellatum, Bl	20	749
OLEINEÆ	iii.	591	subulatum, Bl	٧i.	184
Oleoxylon balsamiferum, Wal	ll. i.	298	Operculina Turpethum, Mans.	iv.	112
Oligolepis amaranthoides,			Ophelia affinis, Arn		126
Wight	iii.	274	alata, Griseb		125
Oligomeris, Camb		181	alba, Arn	• • •	127
glaucescens, Camb		181	angustifolia, D. Don		125
Oligopholis tubulosa, Wigh		321	bimaculata, Sieb. & Zucc.	•••	123
Olus calappoides, Rumph.		657	Chirata, Griseb		124
Olyra malaccensis, Koen.		688	ciliata, G. Don	• • • • • • • • • • • • • • • • • • • •	121
orientalis, Lour		685	cordata, D. Don		123
Omalanthus Leschenaultian		000	cordata, Griseb		123
		469	1 O!1		126
Omphalobium indicum,	•••	100	Dalhousieana, Griseb		121
·	ii.	51	1 1 10 11 11 11		127
50		50	7	• • •	126
	iv.		1 4 7 7 7 7 7 7	• •	125
1 14 A TO CO		159	Griselachiana, Wight		126
	• • • • • • • • • • • • • • • • • • • •	158) 7 ·· A		126
Mile	,,	155	l 1 11 11 Den		124
sp., Hk. f. & T i	 ▼. 155		1 1 1 D D		124
A	ii.	582	macrosperma, Clarke		123
• •	vi.	414	minor, Griseb	• • •	120
1-1' TT		414	multiflora, Dalz		127
Anniamlana Mh		415		• • •	123
A1 707	,,	414	I manufacture D Dan		122
hamida Galad		415	paniculata, D. Don		126
	i:.	141	porrigens, G. Don		125
ann aitelia DO		92	pratensis, Edgew		125
J. Marian Commit	** ;;	140	L		125
1 1 1 11. A A M	"	142	purpurascens, D. Don	•	121
	"	92	racemosa, Griseb	• • •	124
Osamonsii Dalan	,,	141	Andreas of Malmann	• • • • • • • • • • • • • • • • • • • •	122
And the Thirt	;;	85	tetragona, Bidgew		126
. 741		85	trichotoma, W. & A umbellata, Wight		126
	,,	85			122
4 T & C	,,	91			127
glutinosa, Mart.	,,	81		. 123	
1.1		85	OPHIOPOGONEE		264
procurrens, Benth	,,,	85	Ophiopogon, Ker		267
Onopordon langtum, Hb. Mas			brevifolius, Royle		324
Por more rains serion, and the		-5.	, storyound, may to	,,,	

0-1:							
Ophiopogon		Vol.		Ophiorrhiza	1	Vol. 1	
Clarkei, Hk . f	•••	vi.	268	subcapitata, Wall	•••	iii.	83
dracænoides, $Hk.f.$	•••	"	268	succirubra, King	•••	"	82
Griffithii, Hk. f	•••	30	270	Thomsoni, Hk. f	•••	"	82
indicus, Rottl		"	269	tomentosa, Jack	•••	"	79
indicus, Royle		"	270	Translam Whee	•••		88
indicus, Wight	•••		269	And also assume DI		"	78
intermedius, D. Don		",	269	-illogo Book	•••	"	79
japonicus, Ker		"	267		•••	"	78
		268,			•••	"	83
japonicus, Wall			268		•••	"	79
longifolius, Done	•••	₹i.		O	•••	"	00
Malcolmsoni, Royle	•••	"	269	sp., Griff sp., Hk. f. & T. iii. 78, 79	•••	."	82
micranthus, Hk. f	•••	"	269	sp., H.K. 1. oz T. 111. 78, 79	, 62		, 64
minor, Royle	•••	_"_	270	Ophiorrhisiphyllon, Kurz	•••	iv.	403
mollis, Royle		270,		macrobotryum, Kurz	•••	"	403
? pallidus, Wall	vi.	270,		Ophiowylon belgaumense,			
proliferus, Lindl		٧i.	270	Wight	• • •	iii.	634
reptans, $Hk. f. \dots \dots$,,	268	ceylanicum, Wight		"	633
spicatus, Ker		"	270	3: 0 ML	•••	"	633
Wallichianus, Hk. f.		,,	268	***************************************	•••	,,	633
Ophiorrhiza, Linn	•••	iii.	77	41. (27) 1.		"	683
angustifolia, Thw	•••		77		•••		633
117 11		"	78	. 1		"	682
	•••	"	83		•••	"	682
bracteolata, Br	•••	"	79		•••	"	632
Brunonis, W. & A	•••	"	-		•••	"	
calcarata, Hk. f	•••	"	84	Ophiria paradoza, Becc.	•••		411
discolor, Br	• . •	"	79	Ophiurus, Garts	•••	vii.	
discolor, Wall	•••	"	79		•••	"	156
eriantha, Wight	•••	>>	81		•••	"	161
erubescens, Wall		,,	84	corymbosus, Garts.	•••	"	160
fasciculata, D. Don		,,	83		•••	"	99
P geminata, Wall	•••	,,	77	lævis, Benth		,,	158
glechomæfolia, Thw.		"	84		• • •	••	157
gracilis, Kurz		"	80	perforatus, Trin v		158,	160
grandiflora, Wight			80	OPHRYDER v. 668, 674,			
Griffithji, Hk. f		,,	82	Ophrys aranifera, Huds.	•••	vi.	26
	•••	"	78	1 · T.			128
Harrisiana, Heyne hirsutula, Wight	•••	>>	81	Mi L		"	182
	•••	"	83		••••	ï.	583
hispida, Hk. f	•••	"	78		•••		583
hispidula, Wall	•••	77			;;	=",	
imbricata, Gardn	•••	"	81	amentacea, Rozb		57 <u>4</u> ,	
lurida, $Hk. f. \dots \dots$	•••	"	82		•••	i.	582
Mungos, Linn	•••	"	77	Cumingiana, Baill	•••	٧.	236
Mungos, Wall		"	81		•••	i.	584
nana, Edgew	•••	,,	46	manillana, Baill	•••	٧.	236
nemorosa, Thw		"	77	odorata, Spreng	•••	i.	554
nutans, Clarke	•••	,,	84	OPILIEM	•••	i.	573
ochroleuca, Hk. f	•••	"	78	Oplismenus, Beauv		vii:	65
oppositiflora, Hk. f.	•••		80			,,	66
		"	81	emulans, R. & S	•••		66
pallida, Thw	•••	"	84	emulus, Kunth	•••	"	66
pauciflora, Hk. f	•••	"	81	D	•••	"	68
pectinata, Arn	•••	"	78			"	68
prostrata, D. Don	•••	"		atbus, R. & S	•••	: "ac	-:
radicans, Gardn	•••	"	80	brasiliensis, Raddi			3, 68
roses, Hk . f	•••	"	78	bromoides, Baker	••	Vii.	
Roxburghiana, Wight	•••	,,	81	bromoides, Beauv	•••	"	68
rugosa, Hk. f. & T		,,	82	Burmanni, Thw	•••	>=	66
rugosa, Wall		"	78	Bprmannii, Beauv	•••	"	68
•							

				•
Oplismenus .	Vol. I		Orchis Vol. 1	
colonus, H. B. K	vii.	32	commelinifolia, Roxb vi.	143
compositus, Beauv	••• ,,	66	cubitalis, Linu ,,	157
compositus, Kunth	,,	67	gigantea, Sm ,,	137
compositus, Both	,,	34	grandiflora, Heyne ,,	136
Crus-galli, Dum	,,	31	Hatagirea, D. Don ,.	127
Crus-pavonis, H. B. K.	,,	31	incarnata, Linn ,,	127
? cuspidatus, Kunth	***);	32	latifolia, Linn ,,	127
decompositus, Nees	***))	66	leucantha, Ham ,,	161
? dubius, Kunth	vii. 31	. 68	longicornu, Heyne ,,	139
elatior, Beauv	vii.	66	maculata, Linn ,,	127
flaccidus, R. & S	••• ;;	66	micranthema, Ham	160
frumentaceus, Kunth	••• ,,	32	mysorensis, Heyne vi. 135,	150
? hirsulus, Schult	••• ,,	35	obcordata, D. Don vi.	164
	• • • • • • • • • • • • • • • • • • • •	66	pectinata, Sm ,,	137
hirtellus, R. & S Phirtus, R. & S		81	mlandand Daub	140
Humboldtianus, Nees	••	68		141
1 1 1777 TO B. CI	***	66	7 4 7 17 327:33.3	140
A 1 1 TO 0 CI	••• ,,	68		140
r maicus, R. & S	vii. 67			127
indicus, Wight indicus, Willd	vii.	66	C14 1	128
		66	Stracheyi, Hk. f ,, strateumatica, Linn. vi. 103,	
Jacquini, Kunth	*** ***	35	4 4 4 44	143
javanicus, R. & S	" " " " " " " " " " " " " " " " " "			164
lanceolatus, Kunth	vii. 66		Susannæ, Heyne ,,	137
lanceolatus, Wall	vii.	67	Susanna, Linn ,,	
lanceolatus, Wight	••• ,,	67	tenuis, Rottl ,,	141 851
latifolius, Hænke	,,	66 66	triplicata, Willem v.	167
latifolius, Str. & Wint.	••• ,,		unistora, Roxb vi.	150
limosus, Presl	••• ,,	31 66	viridiflora, Sw ,,	589
loliaceus, Beauv	••• ,,	31	Oreocnide acuminata, Kurz v.	590
longisetus, Kunth	,,	332	sylvatica, Miq ,, Oreocome Candolleana, Edgew. ii.	700
? magellanicus, R. & S. muricatus, Kunth	••• ,,	31		700
parvifolius, Kunth	••• ,,	66	elata, Edgew ,,	700
	,,	67	filicifolia, Edgew ,, sp., Hk. f. & T ii. 698,	
	••• ,,	37		709
? prostratus, Edgew. Pseudo-colonus, Kunth	••• ,,	32		709
sabulicolus, Kunth	*** ,,	31	foliosa, $Lindl.$,, indica, $Hk.f.$ $v.709$, $vi.$	7
177	••• ,,	31		709
	,,	64	Oreoseris lanuginosa, DC iil.	390
setarius, B. & S	,,	66	1	390
stagninus, Kunth	••• ,,	31	9 minor DC	390
sylvaticus, R. & S	*** ***	67	1:5-1:- W/-11	390
undulatifolius, Beauv.	,,	66	pusilla, DC ,,	390
undulatifolius, Str. & Y		66	Oreosolen, Hk. f iv.	318
sp., Wall	,,	68	Wattii, Hk. f ,,	319
Opuntia Dillenii, Haw.	ii.	657	Origanum, Tourn iv.	648
Orania, Zippell	vi.	423	? benghalense, Burm ,,	632
macrocladus, Mart.	,,	423	? indicum, Roth iv. 632,	634
nicobarica, Kurz	,,	418	laxiflora, Royle iv.	648
Oraoma canarana, Turoz	i.	560	Majorana, Linn ,,	648
Orchidantha, N. E. Brown		264	normale, D. Don ,,	648
ORCHIDEA:	▼. 667, v	7i. 1 •	vulgare, Linn ,,	648
Orchipeda fastida, Bl		658	Wallichiana, Benth "	648
Orohis, Linn	vi.	126	watariense, Roxb ,,	627
altissima, Ham	••• 33	137	Watsoni, T. A. Schmidt ,,	648
Chusus, D. Don	,,	127	Ormocarpum, Beauv ii.	152
clavato, Heyne	•••))	150	coronilloides, G. Don "	152

				•		•
Ormocarpum	V ol.	Page	Orobanche		Vol.	Page
sennoides, DC	. ii.	152	indica, Spreng		i٧.	299
Ormosia, Jacks	. ii.	252	indica, Wall		,,	325
acuminata, Wall	. "	250	kashmirica, Clarke		"	324
coarctata, Jacks	• • • • • • • • • • • • • • • • • • • •	253	Nicotianse, Wight	•••	"	326
floribunda, Wall		252	epedunculata, Rexb			320
glauca, Wall		253	psila, Clarke	•••	**	327
anadiasa Dakan		253	1	•••	"	326
		253		•••	"	325
	• • • • • • • • • • • • • • • • • • • •	253	Solmsii, Clarke	•••	."	181
	-	_ : .	Orobus aureus, Stev	•••	11.	
robusta, Wight		252	Emodi, Wall	•••	,,	181
travancorica, Bedd	. ,,	253	lævigatus, W. & K	•••	,,	180
venosa, Baker		254	luteus, Linn	•••	"	180
Ornitharium striatulum, Lind		34	orientalis, Boiss	•••	"	181
Ornithidium bracteatum, Wa	ll. v.	772	Orontieze		٧i.	492
imbricatum, Wall	. ,,	846	Oropetium, Trin	•••	vii.	366
Ornithobosa, Clarke	, iv.	365	Thomseum, Trin		,,	366
Parishii, Clarke	. ,,	366	Orophea, Bl	•••	i.	9)
Ornithocephalochloa areni			acuminata. A. DC.	•••	,,	91
	. vii.	91	Brandisii, Hk. f. & T.		"	91
	ri. 76,		coriacea, Thw		• •	93
	. vi.	76	enterocarpa, Maing.	•••	,,	92
		76		•••	,,	91
fuscus, Wall	-	34	erythrocarpa, Bedd.	•••	"	77
striatulus, Hort. Calc	• ,,	9.4	Heyneana, Hk. f. & T.	•••	"	
Ornithogalum falcatum,		000	Publiqua, Hk. f. & T.	•••	"	98
Wight	. vi.	336	polycarpa, A. DC	•••	,,	91
indicum, Koen	. ,,	334	Thomsoni, Bedd	•••	"	91
ındicum, Roem	. ,,	335	uniflora, Hk. f. & T.	• • •	"	90
polyphyllum, Heyne	٠,,	348	zeylanica, Hk . f. & T.	• • •	**	90
Ornithopus perpusillus,			Oroxylum, Vent	•••	į٧.	377
Schmidt	. ii.	161	indicum, Vent		,,	378
Ornitrophe allophyllus, Pers		673	Orsidice amplexicaulis,			
aporetica, Roxb		674	Rchb. f		vi.	40
asiatica, Hort		674	Orthanthera, Wight		i₹.	64
asiatica, Hort Cobbe, Willd		673	viminea, W. & A	•••	11	64
		67±	Orthopogon æmulus, Br.		vii.	88
	•••	674				73
malabarica, Hb. Madr		674		•••	"	68
Schmiedelia, Pers	-			• • •	"	68
serrata, Roxb	• ,,	674	Burmanni, Br	•••	"	
villosa, Roxb	• ' '	674	compositus, Br	•••	**	67
Ornus floribunda, Dietr	. 111.	605	Crus-galli, Spreng	•••	"	31
Moorcroftiana, G. Don	. ,,	606	flaccidus, Br	•••	,,	66
urophylla, G. Don	. ,,	605	gonyrrhizus, Miq	•••	"	66
xanthoxyloides, G. Don		608	hirtellus, Br	•••	,,	66
OROBANCHACER	. iv.	319	Junghuhnii, Nees	•••	,,	67
Orobanche, Linn	. iv.	324	loliaceus, Spreng		,,	67
acaulis, Roxb		320	longeracemosus, Miq.	•••	**	67
Æginetia, Linn		320	pratensis, Spreng		••	67
ægyptiaca, Pers		327	remotus, Trin		,,	67
borealis, Turcz		325	Retzii, Spreng		"	31
		324	setarius, Spreng			66
		325	squarrosus, Spreng.	••••		62
cernus, Loeffl		326	1 -, 4		"	67
Clarkei, Hk. f		325	undulatifolius, Spreng.	•••	,,	66
Epithymum, DC				•••	**	66
? fætida, Klotz		325	undulatus, Link		**	
? Galii, Klots	• ,,	325	sp., Griff	••••		67
Hansii, Kern	,,,	325	Orthoraphium Roylei, N			
indica, Ham	. ,,	326	Orthosiphon, Benth	•••	ıv.	613
•						

Orthosiphon		v	7 01 1	Page	•		Vol.	Pag
			i v.	615	Osbeckia, Linn,		ii.	513
comosus, Wight	•••		"	615	alveolata, Bedd		"	520
diffusus, Benth.	•••		"	613	angustifolia, D. Don		"	515
glabratus, Benth.	•••	•••	"	614	aspera, Bl		"	519
hispidus, Benth.		•••	"	613	aspera, Wt. & Arn	•••	,,	519
incurvus, Benth.			"	614	aspericaulis, Hk.f		,,	520
inodorus, Kon.		•••	"	613	brachystemon, Naud.		"	514
pallidus, Royle	•••	•••	"	613	buxifolia, Arn	•••	,,	518
robustus, Hk. f.	•••		"	614	campestris, Wall		,,	518
rubicundus, Benth.			"	614	capitata, Benth		"	516
scapiger, Benth.	•••	•••	"	615	chinensis, Linn		,,	515
stamineus, Benth.		•••	"	615	chinensis. Linn		"	516
tomentosus, Benth.		•••	"	613	Chulesis, D. Don		,,	522
? triste, Both, vide O			,,	613	confertiflora, Naud	•••	,,	514
verticillatus, Heyne		•••	,,	613	crinita, Benth		,,	517
virgatus, Benth.		•••	"	615	crinita, Nand	•••	,,	517
viscosus, Benth.		•••	,,	614	cupularis, D. Don	•••	,,	514
ORTHOSPERMEÆ	•••	•••	íi.	605	debilis, Naud		,,	516
Orthostemon erectum,	Br.	•••	iv.	103	decora, Wall	•••	,,	515
			,,	103	elliptica, Naud	•••	"	520
A 1 1 1	•••		ii.	661	Gardneriana, Wight	•••	"	520
decumbens, Forsk.		•••	,,	661	glabrata, Wall	•••	"	515
Oryza, Linn		• • •	Vii.	. 92	glauca, Benth	•••	,,	519
ciliata, Ham	•••		٠,	94	glauca, Naud	•••	,,	516
clandestina, A. Br.			,,	94	gracilis, Bedd	•••	"	518
coarctata, Rosb.		•••	"	93	hispidissima, Wight	•••	,,	516
denudata, Steud.	•••	•••	,,	92	japonica, Naud	•••	,,	515
fatua, Koen			,,	92	Kleinii, Arn	•••	,,	519
		•••		93	Leschenaultians, DC .	•••	,,	520
filiformis, Ham.			,,	93 93	Leschenaultiana, DC. Leschenaultiana, Dalz.	-	"	
filiformis, Ham. granulata, Nees &	 Arn.		"		Leschenaultiana, Dalz.		,,	514
filiformis, Ham. granulata, Nees & hexandra, Doell			,,	93	Leschenaultiana, Delz. Gibs Leschenaultiana, Thw.	. & ii.	514,	514 515
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv	 Arn. 		,, ,,	93 94	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight	. & ii.	,,	514 515 514
filiformis, Ham. granulata, Nees & hexandra, Doell	 Arn. 		" "	93 94 92	Leschenaultiana, Dalz. Gibs	. & ii.	514,	514 515 514 515
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud	Arn.		,, ,, ,,	93 94 92 93	Leschenaultiana, Dalz. Gibs		,, 514, ii.	514 515 514 515 518
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham.	Arn.		" " " " " " "	93 94 92 93 92 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall minor, Triana	ii.	514, ii.	514 515 514 515 518 519
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall.	Arn.		;; ;; ;; ;; ;;	93 94 92 93 92 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall minor, Trians Moonii, Thw	ii.	514, ii.	514 515 514 515 518 519 520
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb.	Arn		;; ;; ;; ;; ;; ;;	93 94 92 93 92 93 92 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall minor, Triana Moonii, Thw muralis, Naud	ii.	514, ii.	514 515 514 515 516 519 520 514
filiformis, Ham. granulata, Nees & hevandra, Doell latifolia, Desv montana, Ham. mutica, Steud officialis, Wall. palustris, Ham	 Arn. 		;; ;; ;; ;; ;; ;; ;; ;;	93 94 92 93 92 93 92 93 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw muralis, Naud. myrtifolia, Bl	ii.	514, ii.	514 515 514 515 518 519 520 514 515
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Stend officiaalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch.	 Arn. 		;; ;; ;; ;; ;; ;; ;; ;; ;;	93 94 92 93 92 93 92 93 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall minor, Trians Moonii, Thw muralis, Naud myrtifolia, Bl nepalensis, Hook	ii.	514, ii.	514 515 514 515 518 519 520 514 515 521
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff.	 Arn. 		,, ,, ,, ,, ,, ,, ,,	93 94 92 93 92 93 92 93 93 92	Leschenaultiana, Dalz. Gibs	ii.	514, ii.	514 515 514 515 518 519 520 514 515 521 521
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Bidleyi, Hk. f rufipogon, Griff. sativa, Linn	Arn.		;; ;; ;; ;; ;; ;; ;; ;; ;;	93 94 92 93 92 93 92 93 92 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall minor, Triana Moonii, Thw muralis, Naud myrtifolia, Bl nepalensis, Hook. nutans, Wall octandra, DC	ii.	514, ii. ", ", ", ", ", ", ",	514 515 514 515 516 519 520 514 515 521 521
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officiaalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Thw	Arn.		;; ;; ;; ;; ;; ;; ;; ;; ;; ;;	93 94 92 93 92 93 92 93 92 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall parvifolia, Arn	ii.	514, ii	514 515 514 515 516 519 520 514 515 521 521 521
filiformis, Ham. granulata, Nees f hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Thw segetalis, Russ	Arn.)1)1)1)1)1)1)1)1)1)1)1)1)1)	93 94 92 93 93 92 93 93 92 93 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall parvifolia, Arn. polycephala, Naud	ii.	514, ii, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	514 515 514 515 518 520 514 515 521 521 521 521 521
filiformis, Ham. granulata, Nees f hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Thw. segetalis, Russ sorqhoides, Steud.	Arn.		21 77 77 77 77 77 77 77 77 77 77 77 77 77	93 94 92 93 92 93 92 93 92 93 92 93	Leschenaultiana, Dalz. Gibs	ii.	514, ii. ""	514 515 514 515 518 519 520 514 515 521 521 521 515
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Linn segetalis, Russ sorqhoides, Steud. triandra, Heyne	Arn.		11 11 11 11 11 11 11 11 11 11 11 11 11	93 94 92 93 92 93 92 93 92 93 92 93 92 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall Moonii, Thw muralis, Naud myrtifolia, Bl nepalensis, Hook nutans, Wall cotandra, DC parvifolia, Arn. polycephala, Naud pulchella, Wall reticulata, Bedd	ii.	514, ii.	514 515 514 515 516 519 520 514 521 521 521 521 515 521 518
filiformis, Ham. granulata, Nees f hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Bidleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Thw. segetalis, Russ sogqhoides, Steud. triandra, Heyne triticoides, Griff.	 Arn. 		;; ;; ;; ;; ;; ;; ;; ;; ;; ;; ;; ;; ;;	93 94 92 93 93 92 93 93 93 93 93 93 93 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw. muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall. cotandra, DC parvifolia, Arn. polycephala, Naud. pulchella, Wall. reticulata, Bdd Rheedii, Thw	ii.	514, ii.	514 515 514 515 516 519 520 514 521 521 521 521 515 520 515
filiformis, Ham. granulata, Nees f hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officiaclis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufpogon, Griff. sativa, Linn sativa, Linn sorqhoides, Steud. triandra, Heyne trüticoides, Griff. ORYZEE	Arn.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	93 94 92 93 93 93 93 93 93 93 93 93 93 93 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw. muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall polycephala, Naud. pulchella, Wall. reticulata, Bedd. Rheedii, Thw rostrata, D. Don	ii.	514, ii.	514 515 514 515 518 519 520 514 515 521 521 521 521 518 520 518 520 518
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud oficisalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Linn sorqhoides, Steud. triandra, Heyne triticioides, Griff. ORYZEZ Oryzopsis, Michx.			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	93 94 92 93 93 93 93 93 93 93 93 93 93 93 93 93	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall parvifolia, Arn. polycephala, Naud. pulchella, Wall reticulata, Bedd Rheedii, Thw rostrata, D. Don robicunda, Arn	ii.	514, ii.	514 515 514 515 519 520 514 515 521 521 521 515 521 515 521 515 521 515 521 515
filiformis, Ham. granulata, Nees & hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Linn segetalis, Russ sorqhoides, Steud. triandra, Heyne triticoides, Griff. ORYZEE Oryzopsis, Michx. sequiglumis, Duthie	Arn.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	93 94 92 92 92 93 92 93 92 93 93 94 93 94 93 94 94 94 94 94 94 94 94 94 94 94 94 94	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall minor, Triana Moonii, Thw muralis, Naud myrtifolia, Bl nepalensis, Hook nutans, Wall octandra, DC parvifolia, Arn polycephala, Naud pulchella, Wall reticulata, Bedd Rheedii, Thw rostrata, D. Don ru biounda, Arn serialis, Naud	ii.	514, ii.	514 515 514 515 516 519 520 521 521 521 521 521 521 521 520 516 520 510 510 510 510 510 510 510 510 510 51
filiformis, Ham. granulata, Nees franulata, Nees franulata, Nees francis, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Thw. segetalis, Russ sorphoides, Rteud. triandra, Heyne triticoides, Griff. ORYZEE Oryzopsis, Michx. sequiglumis, Duthie f carulescess, Duth	Arn.		,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,,	93 94 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 94 92 93 94 94 94 94 94 94 94 94 94 94 94 94 94	Leschenaultiana, Dalz. Gibs	ii.	514, ii	514 516 514 515 518 518 520 514 515 521 515 521 518 520 515 520 516 520 516 520 516 520 516 520 517 520 520 520 520 520 520 520 520 520 520
filiformis, Ham. granulata, Nees f hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officialis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Thw. segetalis, Russ sorqhoides, Steud. triandra, Heyne triticoides, Griff. ORYZEE Oryzopsis, Michx. squiglumis, Duthie cærulescens, Duth divulsa, Clarke			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	93 94 92 93 92 93 92 93 92 93 92 93 92 93 92 234 234 234	Leschenaultiana, Dalz. Gibs	ii.	514, ii	514 515 514 515 518 518 520 514 615 521 521 515 521 515 520 516 520 516 517 521 517
filiformis, Ham. granulata, Nees f hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud oficinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Linn sorqhoides, Steud. triandra, Heyne triticioides, Griff. ORYZEZ Oryxopsis, Michx. sequiglumis, Duthie f carulescens, Duth divulsa, Clarke Duthiei, Hack			" " " " " " " " " " " " " " " " " " "	93 94 92 93 92 93 92 93 92 92 92 93 92 92 234 234 284	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall cotandra, DC parvifolia, Arn. polycephala, Naud. pulchella, Wall. reticulata, Bedd. Rheedii, Thw rostrata, D. Don rabicunda, Ars. serialis, Naud speciosa, D. Don stellata, Naud stellata, Naud	ii.	514, ii	514 515 516 515 516 516 520 521 521 521 521 521 515 520 516 520 517 520 516 520 517 520 517 520 515 517 520 515 517 520 515 516 517 518 520 518 520 521 521 521 521 521 521 521 521 521 521
filiformis, Ham. granulata, Nees franulata, Nees franulata, Nees franulata, Nees franulata, Pesu montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Linn sativa, Thw segetalis, Russ sorqhoides, Steud. triandra, Heyne triticoides, Griff. ORYZEE Oryzopsis, Michx. sequiglumis, Duthie frarulescens, Duth divulsa, Clarke Duthiei, Hack effusa, Hack			;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	93 94 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 93 94 93 94 94 95 96 97 98 98 98 98 98 98 98 98 98 98	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall minor, Triana Moonii, Thw muralis, Naud myrtifolia, Bl nepalensis, Hook nutans, Wall cotandra, DC parvifolia, Arn polycephala, Naud pulchella, Wall reticulata, Bedd Rheedii, Thw rostrata, D. Don ru bicunda, Arn serialis, Naud speciosa, D. Don stellata, Naud stellata, Naud stellata, Wall	ii.	514, ii	514 516 516 517 518 519 520 521 521 521 521 521 521 518 520 516 520 516 520 517 520 517 520 517
filiformis, Ham. granulata, Nees f hexandra, Doell latifolia, Desv montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham. Ridleyi, Hk. f rufipogon, Griff. sativa, Linn. sativa, Linn. setiva, Thw. segetalis, Russ sorohoides, Steud. triandra, Heyne triticoides, Griff. ORYZEE Oryzopsis, Michx. sequiglumis, Duthie ? cærulescens, Duth divulsa, Clarke Duthiei, Hack effusa, Hack kashmirensis, Hack.			;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	93 94 92 93 93 92 93 92 93 92 92 93 92 234 234 234 234 234	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw. muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall cotandra, DC parvifolia, Arn. polycephala, Naud. pulchella, Wall resticulata, Bedd Rheedii, Thw rostrata, D. Don ra biounda, Arn. serialis, Naud speciosa, D. Don stellata, Naud speciosa, D. Don stellata, Naud stellata, Naud stellata, Wall ternifolia, D. Don	ii.	514, ii	514 515 514 515 516 519 520 521 521 521 521 521 520 516 520 517 520 517 517
filiformis, Ham. granulata, Nees franulata, Nees franulata, Nees franulata, Nees franulata, Pesu montana, Ham. mutica, Steud officinalis, Wall. palustris, Ham palustris, Salisb. platyphylla, Sch. repens, Ham Ridleyi, Hk. f rufipogon, Griff. sativa, Linn sativa, Linn sativa, Thw segetalis, Russ sorqhoides, Steud. triandra, Heyne triticoides, Griff. ORYZEE Oryzopsis, Michx. sequiglumis, Duthie frarulescens, Duth divulsa, Clarke Duthiei, Hack effusa, Hack			;; ;; ;; ;; ;; ;; ;; ;; ;; ;; ;; ;; ;;	93 94 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 92 93 93 94 93 94 94 95 96 97 98 98 98 98 98 98 98 98 98 98	Leschenaultiana, Dalz. Gibs Leschenaultiana, Thw. Leschenaultiana, Wight linearis, Bl longicollis, Wall. minor, Triana Moonii, Thw. muralis, Naud. myrtifolia, Bl nepalensis, Hook. nutans, Wall. octandra, DC. parvifolia, Arn. polycephala, Naud. pulchella, Wall. reticulata, Bedd. Rheedii, Thw. rostrata, D. Don ru biounda, Arn. serialis, Naud. speciosa, D. Don stellata, Naud. speciosa, D. Don stellata, Naud. ternifolia, Naud. ternifolia, D. Don tetrandra, Roxh.	ii.	514, ii	514 516 516 517 518 519 520 521 521 521 521 521 521 518 520 516 520 516 520 517 520 517 520 517

Osbeckia	Vo	ol. Page	o Otophora	,	Vol.	Page
truncata, Arn	i	i. 5Ì4	erythrocalyx, Hiern	•••		680
virgata, W. & A	,	, 521	fruticosa, Bl i.	674,		685
virgata, Wight		, 521	paucijuga, Hiern			680
Walkeri, Arn ,	••• ,	E10	Otosema caudata, Benth.	164	ii.	109
Wightiana, Benth		, 519			,,	109
Wightiana, Benth		4, 52			"	109
wynaadensis, Clarke	i	. '		•••	"	108
zeylanica, Willd		, 516		•••	iv.	679
zeylanica, Ker		, 518	limbata, Benth	•••	,,	680
zeylanica, Naud	,	615			iŸ.	55
zeylanica, Steud		514	,	• •••	₹.	662
OSBECKIEÆ		i. 512	,	•••		662
Osbeckioidea, Griff	ii				"	662
Osmanthus, Lour		i. 606			í,	667
acuminata, Wall		C/V				365
fragrans, Lour	•	ROF	,		ii.	160
<u> </u>	••• ,	, 607	,			161
	;			•••	."	288
Osmelia, Thw		i. 595 , 5 95		•••		275
zeylanica, Thu	;		,	•••	ii.	
Osmorhiza, DC	1	i. 690				564
brevistylis, DC	••• ,		1		iv.	595
Claytoni, Clarke	,			•••	i.	426
laxa, Royle	,			• • •	i.	435
longistylis, DC	_ :: .:	, 690		•••	"	436
Osmothamnus fragrans,	DC, ii			•••	"	437
pallidus, DC	,	472		• • •	,,	436
Ostodes, Bl	v				,,	437
appendiculata, Hk. f.	,	, 401	gracilenta, Kurz	•••	"	438
Helferi, Muell	,	, 4 01	Griffithii, Edgew. & Hk	. f.	,,	436
minor, Muell	,	, 400	Metziana, Miq	•••	,,	438
muricata, Hk. f	,	401	Petersii, Klotz		,,	437
paniculata, Bl	,	400			,,	436
zeylanica, Muell	••• ;	400		i. 4	37,	438
OSYRIDER	v	200			i.	436
Osyris, Linn	v		sensitiva, Linn		,,	438
arborea, Wall	••• ,	099			"	438
? peltata, Roxb	•	140			,,	439
rotundata, Griff	,,	694	seasitiva, Zucc	•••	"	437
Wightiana, Wall		้ดจอ	sessilis, Ham		"	437
Otandra cernua, Salisb.	v i		Oxyanthe japonica, Steud.	7	ii.	
Otanthera, Bl	ii		Oxyanthera, Brongn		vi.	87
bracteata, Korth		_ E00	micrantha, Brongn.	vi.		
	••• ,,	E0.0	Oxybaphus, Vahl			708
	,1	500	himalaicus, Edgew			708
	,,	599	Oxycarpus gangetica, Ham		"	262
moluccana, Bl	,,	522	Oxydium sp., Benn			174
nicobaronsis, Teysm. & B					i.	21
rubro-limbata, Link &		523	Oxygraphis, Bunge			21
Othonnopsis, J. & S	111		glacialis, Bunge		"	21
intermedia, Boiss		356	polypetala, Hk. f. & T.		;	70
Otochilus, Lindl	▼.	843	Oxymitra, Bl		i.	
alba, Lindl v.	843, v	1. 195	affinis, Hk. f. & T	•••	"	70
fusca, Lindl	▼.		filipes, Hk. f. & T	•••	"	71
lancifolia, Griff	,,	844	fornicate, Hk. f. & T.	•••	"	71
latifolia, Griff	,,	844	glauca, Ilk. f. & T	•••	"	71
	,,	844	latifolia, Hk. f. & T.		,,	70
Otonychium imbricatum,		692	Maclellandii, Hk. f. & T		"	70
Otophora, Bl	i.	680	macrophylla, A. DC.	•••	"	78

Oxymitra Vol. Page	Pachycentria Vol. Page
	Walkeri, Thw ii. 526
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Pachyderma javanicum, Bl. iii. 612
Oxyramphis macrostyle, Lindl. i. 144	Pachygone, Miers i. 105
macrostyla, Wall ,, 144	adversa, Miers , 105
sericea, Grah ,, 14i	concinna, Miers ,, 105
stenocarpa, Klotz ,, 144	odorifera, Miers ,, 105
virgata, Wall ,, 144	ovata, Miers ,, 105
Oxyria, Hill v. 58	Plukenetii, Miers ,, 105
digyna, <i>Hill</i> ,, 58	PACHYGONEE i. 95
elatior, Br ;, 58	Pachyrhizus, Rich ii. 207
reniformis, Hook ,, 58	angulatus Dich 907
Oxysepala ovalifolia, Wight v. 753	mollis, Hassk ,, 207
Oxyspora, DC ii. 525	twileberg DC 907
commo /Tuisma 596	Pachysandra ? coriacea, Hook. v. 266
maniamiata DO 595	Pachystemon populifolius,
598	
	,,,
	Pachystoma, Bl. v. 811, vi. 178
OXYSPOREE ii. 512	Edgeworthii, Rchb. f v. 812
Oxystelms, Br iv. 17	Fortunei, Rohb. f ,, 814
P caudatum, Ham ,, 20	Josephi, Rchh. f ,, 815
esculentum, Br ,, 17	Lindleyanum, Robb. f ,, 812
Wallichii, Wight ,, 17	malabaricum, Rehb. f ,, 812
Oxystophyllum atropurpureum,	montanum, Rchb. f ,, 812
Bi v. 724	parvifolium, Rohb. f ,, 814
carnosum, Bl ,, 724	senile, Rchb. f ,, 812
macrostoma, Hassk ,, 723	Smithianum, Rohb. f ,, 812
Oxytenanthera, Munro vii. 400	speciosum, Rohb. f ,, 812
albo-ciliata, Munro ,, 401	Wijhtii, Rohb. f ,, 814
Bourdilloni, Gamble ,, 403	Pacourea Gudara, Ham iii. 624
monostigma, Bedd ,, 402	Padbruggia dasyphylla, Miq. ii 110
nigrociliata, Munro ,, 401	Padia Meyeriana, Zoll. and
	1 35
signate Gamble 401	D. 3. 3. 71.
Shaabaii Marana 402	hambulada Mia 107
Mh-maisanii Marana 409	colucina Vaus
Oxytropis. DC ii. 137	anceta Domb 107
100	erecta, Roxb ,, 197
	fœtida, Linn ,, 195
,, ,, ,,	fætida, Benth ,, 197
chiliophylla, Royle ,, 139	fætida, Wall " 196
densa, Benth , 138	lanuginosa, Wall , 196
diffuse, Led ,, 140	lanuginosa, Kurz ,, 196
floribunda, Benth ,, 138	lanuginosa, Wall ,, 196
glabra, DC ,, 140	Plinearis, Hk. f ,, 197
glacialis, Benth ,, 137	macrocarpa, Wall ,, 196
humifusa, Kar. & Kir ,, 137.	ovata, Miq ,, 195
lapponica, Gaud ,, 137	pilitera, Hk. f ,, 196
Meinshausenii, Schr ,, 139	recurva, Roxb ,, 197
microphylla, DC , 139	sessiliflora, DC ,, 195
microthyncha, Benth ,, 137	ternata, Wall ,, 193
mollis, Royle ,, 137	tetrandra, Wall " 160
Stracheyana, Benth ,, 138	tomentosa, Bl ,, 197
tatarica, Jacquem ,, 138	verticillata, Bl ,, 195
Thomsoni, Benth ,, 138	Walliohii, Hk. f ,, 196
Ozodia famiculacea, W. & A. ii. 695	sp., Griff , 197
	PADERIEA iii. 21, 195
Pachycentria tuberculata, Korth. ii. 565	Pæderota Amherstiana, Wall. iv. 291
T mound on the two or owners and are are one	1 2 0001000 ZEIII100100100100, 11 011. 17. 201

				•		_
Pæderota	Vol	. Page	1		Vol.	Page
	iv		Pandaneæ, Wall	•••		
	. ,,		Pandanophyllum, Hassk.	•••	Vi.	682
	. "	288	angustifolium, Kurz	•••	"	683
	1.		costatum, Kurz	•••	"	684
	. ,,	30	humile, Hassk	•••	,,	683
Emodi, Wall	. ,,		humile, Zoll	•••	"	682
officinalis, Hk. f. & T.		30	hypolytroides, F. Muell.	•••	,,	680
PEONIEE	i.		immersum, Thw	•••	**	683
Pajanelia, DC	. iv.	384	Miquelianum, Kurz	•••	11	683
multijuga, Kurz	. ,,	384	palustre, Boeck	•••	,,	681
Rheedii, DC	. ,,	384	palustre, Hassk	•••	,,	681
Palenga zeylanica, Thw	. v.		palustre, Kurz	•••	,,	682
Palimbia ramosissima, DC	. ii.	709	Wendlandi, Gard. Chr.	•••	"	683
ramosissima, Thw	. ,,	710	zeylanicum, Kurz	•••	"	682
PALMEAS	. vi	. 402	zeylanicum, Thw	•••	,,	682
Palmia bicolor, Endl	. iv.	. 216	Zippelianum, Kurz	•••	"	683
Panaceæ	. ii.	72 0	Pandanus, Linn	•••	vi.	483
Panax, Linn	. ii.	725	andamanensium, Kurz	•••	,,	485
aculeatum, Ait	. ,,	726	albus, Hort	•••	,,	486
armatum, Wall	. ,,	723	atrocarpus, Griff	•••	"	484
bijugum, Wall		725	Candelabrum, Kurz		,,	485
bipinnatifidum, Seem		722	caricosus, Spreng	•••	,,	484
curcifolium, Griff		735			"	484
decompositum, Wall		722			"	484
? foliolosum, Wall		723	107-11	•••	"	484
fragrans, Roxb		734	foreignlands Yam		77	485
fruticosum, Linn	• • • • • • • • • • • • • • • • • • • •	725	Carefalana Danil		,,	483
Ginseng, C. A. Mey		721	A.m A.m. D L		"	484
? Heyneanum, Wall		727	A.m. A. TT		,,	486
Jackianum, Wall		734	A		"	484
Leschenaultii, DC		724	1		"	486
Loureirianum, DC		726	hounder Doine		"	486
micranthum, Wall		724	11 - 11 - 42 O		"	486
palmatum, Roxb	-	735	1		"	486
pinnatum, Lamk		734	1 4 10 11 T		**	486
polycarpum, Wall	•••	734	T - 2 - V		"	496
Pseudo-ginseng, Wall		721	landa Dumul	•••	"	486
quinquefolius, Linn		722	T T	•••	"	486
secundum, Schultz		734	7		"	485
serratum, Wall	•	738	Transfer the Transfer	•••	"	485
spinosum, Linn. f		726	1 7	•••	,,	486
tomentosum, DC	- "	728		•••	"	485
tripinnatum, Wall	• • • • • • • • • • • • • • • • • • • •	722	l adametraciones Da-la		"	483
Panoratium, Linn	:	-00	3 4 61 . 1 ! - 1.		,,	485
biflorum, Rowb		285		•••	"	486
cambayense, Herb		286	77		**	486
longiflorum, Roxb		286	1		"	487
longiflorum, Herb		285	Diam's Const	•••	,,	485
		286	I make Manual Daniel	•••	"	484
malabaricum, Thw malabathricum, Herb		285	1 (•••	"	487
parvum, Dals		286	TT1. 6	•••	"	485
2. 4 0.11.1		285	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	•••	"	485
		285	77	•••	"	485
4 44		285	37	•••	"	487
verecundum, Wight	•••	286			484,	
zeylanicum, Linn	• • • • • • • • • • • • • • • • • • • •	285	Panderia pilosa, Hk. f. &	T.	v.	11
		7.2.			i.	189
PANDANEZ		100	,	•••	-•	

Vol. Page	Panicum	Vol. Pag	0
PANICACEÆ vii. 2	asiaticum, Hort	. vii. 7	8
Panice wii. 2, 10	asperatum, Kunth	. "5	5
Panicum, Linn vii. 26	asperrimum, Fisch	.1	5
abludens, R. & S ,, 59	asperum, Koen	e.	2
acariferum, Trip 61	asperum, Lamk	Q	0
accrescens, Trin ,, 57	asperum, Link	0	5
aciculare, Desv ,, 59	assamicum, Hk. f		0
acroanthum, Steud ,, 52	attenuatum, Hort	7	8
acutiglumum, Steud, 39	attenuatum, Willd	4	6
adhaerens, Forsk ,, 80	atro-virens, Trin		5
adomeseum Willd 12	aurantiacum, Hain		Ó
adetane Stand 95	auritum, Presl	· "	Ō
regarding sum Wort 79	auritum, Hassk	່ ′′ ຄ	9
manustra accom 10 atm 10	auritum, Wall	· ·′ 1	9
	The December	· ″ 9	5
manialmuma IIII. 6	Dalling and Caball	່ " ໑	9
affina Noon 90	·	ໍ່″່າ	6
affine Dain 97	7 .7 . 7 . 337-33	່ ″ ຮ	3
ofnicanum Poin	1 1 1 1 1 1	" 1	6
nitural disa Dat		ii. 33, 3	
albana Charla " 00	1		
	barbatum, Roxb	E.	
alamanumidas Vans 20	barbatum, Telf	" 8	
alopecuroides, Koen ,, 79	barbifultum, Hochst	່ ″ ຄ	5
alopecuroides, Linn ,, 85	barbinode, Trin	· " a	-
Alopecuros, Lamk " 87	batavicum, Steud	. ,,	4
altissimum, Brouss ,, 49	beckmanniæforme, Mikan	"	0
ambiguum, Trin ,, 33	bengalense, Spreng	,	5
ambiguum, Fig. & de Notar. ,, 33	Benjamini, Steud		5
ambiguum, Lapeyr ,, 17	bicolor, Monch	. ,,	0
americanum, Linn " 82	bicorne, Kunth	. ,,	3
Amlisa, Ham ,, 61	bidentatum, Steud		7
amphibium, Stend ,, 35	biflorum, Lamk		5
amplexicaule, Poir ,, 44	biforme, Kanth	. ,,	3
amplexicaule, Rudge ,, 40	blephariphyllum, Trim	. "7	7
amplissimum, Steud ,, 55	brevifolium, Balb	. ,, 4	6
angustatum, Edgew ,, 59	brevifolium, Roxb		4
angustum, Trin vii 41, 42	brevisetum, Doell	7	8
angustum, Wight vii. 42	brizæsormé, Presl	9	0
antidotale, Retz ,, 52	brizoides, Jacq		9
antipodum, Spreng ,, 25	brizoides, Lamk	Q	0
Aparine, Steud ,, 80	brizoides, Linn	0	2
appressum, Doell ,, 30	brizoides, Retz	. 0	9
garamianum Uama 26	bromoides, Lamk	6	8
grantian A Diah	Brownianum, W. & A	=	1
anahieum Noon 39	Brunonianum, Griff	. " .	2
gran course Edmore 50	Burmanni, Bieb	່ ″ ຊ	Ō
anhonosoma Tamba 901	Burmanni, Heyne		7
anhousesma Linn " 44	Burmanni, Retz	_,, ` _	8
7	Burmanni, Schrenk		6
7777 1 4 27 40	cæsium, Nees	. "	8
	N7	່ ″ ຊ	2
		ໍ " ຄ	3
numundadakan Andorsa 19		· ″ A	5
amintatum Rate 87	callosum, Hochst	' " A	3
anistituita Willa 95	canaliculatum, Nees	· ′′ 1	2
aristidoides, Willd ,, 85	Canaræ, Steud	` " •	í
amena Vanah 96	canescens, Roth	`″ ō	6
arvense, Kunth ,, 36	canescens, Wight	. ,, ə	

				•		•
Panicum	Vol.	Page	Panicum		Vol.	Page
capillare, Linn	vii.	59	decompositum, Br	•••	v ii.	51
? Careyanum, Nees	,,	34	decompositum, Duthie	•••	"	50
? carinatum, Presl	,,	57	decompositum, Nees		,,	67
carnosum, Saltzm	,	30	densepilosum, Steud.		"	45
caucasicum, Trin,	,,	28	Mensispica, Poire	•••		87
caudatum, Thunb		41	dichotomum, Forsk.		"	85
cenchroides, Rich	,,	87	didactylum, Kunth	•••	"	13
certificandum, Steud.		67	difference Dook	•••	"	57
Chamaeraphis, Nees	*** ;;	56	1 17 Mars (1919)	•••	**	
	,,	47	1	•••	"	30
Chintaman, Ham	••• ,,	79	dilatatum, Steud	•••	"	16
chrysanthum, Steud.	••• ••	18	dimidiatum, Burm	•••	"	96
ciliare, Retz	,,		dimidiatum, Heyne	V	ii. 37	
ciliare, Thw	,,	15	dimidiatum, Linn	•••	₹ij.	91
ciliare, Wight	,,	16	dispar, Steud	•••	"	26
cimicinum, Retz	,,	64	dissectum, Linn	•••	,,	11
coccospermum, Steud.	,,	34	dissitiflorum, Nees & A	rn.	,,	15
Codqea, Haw	,,	79	distachyon, Hb. Madr.		"	37
colonum, Linn	,,	32	distachyum, Linn		,,	37
coloratum, Cav	,,	50	distans, Trin		,,	29
coloratum, Nees	,,	47	distichum, Gaud		"	17
commutatum, Nees	vii. 18	15	dubium, Lamk		"	25
compactum, Kit	vii		dubium, Sieb	•••	"	30
composito-proximum, Ro		67	eburneum, Trio	•••		49
compositum, Linn		67	echinatum, Willd		ii."30	
compressum, Forsk.		294	elatius, Heyne		vii.	67
concinnum, Edgew.	,,	59	7, 7, 8	•••		67
	,,	54	7 1X7 0 A	• • •	"	
concinnum, Nees	••• ,,	32		•••	"	246
confertum, Rottl	,,	47	elegantissimum, Hk. f.	•••	"	52
confine, Hochst	,,	49	elephantipes, Nees	•••	"	50
confusum, Trin	*** ;;	7.	Elliottii, Trin	•••	"	50
conglomeratum, Rottl.	,,	41	elongatum, Salisb	• • •	,,	78
conjugatum, Dalz. & Gi	ibe. "	64	elytroblepharum, Steud	• • • •	,,	16
contractum, W. & A.	,,	41	eminens, Stoud	• • •	**	16
convolutum, Beauv	,,	50	equinum, Saltzm	•••	•	35
corvipes, Stokes	,,	30	Equisetum, Nees	••	"	49
? corymbosum, Roxb.	vii. 13	, 15	eriogonum, Schrad	• • •	.,	13
corymbosum, Thw	,,	15	eruciforme, Sibth	•••	"	28
coryophorum, Kunth	,,	42	erythrospermum, Vahl		**	78
costatum, Roxb	,,	56	euchroum, Stand		,,	53
costulatum, Bojer	,,	42	excurrens, Trin	•••	,,	55
courtallense, Nees & A		53	extensum, Nees & Arn.	•••	"	16
Crinum-ursi, Bory		99	fasciculatum, Griseb.	•••		49
crispum, Llanos	,,	33	fasciculatum, Nees		"	56
cruciatum, Nees	• • • • • • • • • • • • • • • • • • • •	14	festuciforme, Hochst.		"	332
C	•	30	festucoides, Poir		"	59
	,,	28	2717 . 17	•••	11	15
	,,	32	0110	•••	"	13
Crus-galli, Wall	,,	32 42			i."15	
curvatum, Linn	,,		filiforme, Ruxb			
curvatum, Linn	,,	48	fistulosum, Hochst	•••	Vii.	50
curvatum, Roxb	•••	42	flaccidum, Koen	•••	"	29
cuspidatum, Roxb	*** ,,	32	flaccidum, Wall	•••	"	32
cuspidiglume, Steud.	*** 99	21	flavescens, Sw	•••	"	56
cynosuroides, Rottl	,,	39	flavescens, Moench	•••	"	79
cynosuroides, Scop	,,	80	flavidum, Retz		"	28
Dactylon, Linn	,,	289	flexuorum, Retz	•••	"	59
Daltoni, Purlat	,,	32	floribundum, Willd	•••	,,	80
debile, Donf	••• ,,	16	floridum, Royle			29
	,,				,,	

Panicum			Vol. F		Panicum			Page
fluitans, Heyne	•••	•••	vii.	36	humifusum, Kunth	•	▼11.	17 48
fluitans, Hb. Madr.	•••	٠٠٠.	. "20	29	humile, Nees	•••	"	48
fluitans, Retz	•••		i. 29,		humile, Aitoh	•••	"	80
fluviatile, Nees	•••	•••	₹ii.	41	humile, Thunb	•••	"	80
foliolosum, Wall.	•••	•••	"	81	humile, Trin	•••	"	48
		•••	,,	81	hydaspicum, Edgew.	•••	"	50
frumentaceum, Roz	KD.	•••	"	31	hygrocharis, Steud	•••	"	66
fugar, Koen	•••	•••	"	59	imbecille, Trin	•••	"	80
Gardneri, Thw.	•••	•••	"	26	imberbe, Poir	•••	"	12
germanicum, Mill.	•••	•••	79	78	imperfectum, Roxb	•••	"	
gibbum, Steud	•••	•••	79	57	incisum, Munro	•••	"	51 54
glabrum, Gaud.	•••	•••	"	17	? incomptum, Duthie	•••	"	54
glabrum, Heyne	•••	•••	**	47	incomptum, Trin	•••	"	41
glandulosum, Nees	•••	•••	**	58	incurvum, Linn	•••	"	41
glaucum, Linn	•••	•••	"	79	indicum, Linn	••	"	
globulare, Steud.		•••	,,	78	indicum, Mill	•••	"	78
glomera'um, Moenc	h	•••	"	78	indicum, Wight	•••	:1	42
gonatodes, Steud.	•••	····	. "	25	infidum, Steud	•••	"	59
gongylodes, Jacq.	•••	٧ì	i. 49,		infidum, Trin	•••	"	33
gonyrrhizum, Steud		•••	vii.	66	insectiferum, Koen	•••	**	59
grandistorum, Trin.	•••	•••	"	39	insulicola, Steud	•••	"	40
granulare, Bojer	•••	•••	,,	29	intermedium, Griff	•••	"	62
granulare, Lam.	•••	•••	"	29	intermedium, Roth	•••	"	80
Griffithii, Arn	•••	•••	,,	15		•••	,,	78
grossarium, Griff.	•••		"	34		•••	""	41
grossarium, Koen.	•••	₹i	i. 34,	36		•••	"	40
grossarium, Roxb.	•••	,	, 34,	37		•••	"	41
grossum, Salisb.		•••	vii.	32	Isachne, Roth	•••	"	28
guineerse, Dosf.			,,	44	ischæmoides, Heyne	•••	"	62
hæmatodes, Presl	•••	•••	"	32	ischæmoides, Retz	•••	"	50
Hasskarlii, Steud.			77	39	Ischæmum, Schreb	•••	"	17
Helopus, Trin		٧i	i. 35,	37	italicum, Linn	•••	,,	78
helvolum, Hb. Mad			vii.	81	italicum, Uoria	•••	"	80
helvolum, Linn.			"	79		•••	"	68
hermaphroditum, S			"	57		•••	,,	35
heteranthum, Link	•••		"	58	javanicum, Kunth	• • •	"	85
heteranthum, Noos &	Меу	en	"	16	javanicum, Poir	•••	"	64
Heynii, Roth			"	5!)	javanicum, Thw	• • •	"	33
hirsutum, Heyne		•••	,,	33	javanum, Nees & Bühse		"	40
hirsutum, Koen.	•••	vii	i. 35,	37	Johannæ, Linn	•••	"	41
hirtellum, All			vii.	63	jumentorum, Pers	•••	11	49
hirtellum, Burm.			,,	68	jumentorum, A. Rich.		"	47
	•••		"	30	khasianum, Munro		"	54
hirticalycinum, Sto			,,	3 0		•••	"	55
hirtum, Roth			i. 34,	81	Koenigii, Spreng	• • •	"	35
hirtum, Wall		•••	∀ii.	46	Koenigii, Wight	•••	"	28
hispidulum, Lamk.	•••	•••	"	31	Kotschyanum, Hochst.	•••	"	36
hispidum, Forst.	•••	•••	"	31	Kunthianum, W. & A.	•••	"	21
holcoides, Jacq.	•••		"	79	Kunthii, Steud	•••	"	59
holcoides, Roxb.	•••	•••	"	87	Kurzii, Hk. f	•••	"	38
homonymum, Steud		•••	"	56	læve. Lamk	•••	99	49
hordeiforme, Thunb			. 84,	85	7	•••	"	79
hordeoides, Poir.	•••		vii.	86		•••	"	80
horizontale, Mey.		•••	,,	13	Transaction of the same of	•••	"	87
horridum, Saltam.		•••	"	31	1		"	67
		•••	"	31	3 - 4 * 6 - 3 * T - 2	•••	"	89
humidorum, Ham.		•••	"	53	7 . 0. 1		"	8 5
			••					

Panioum	Vol.	Page	Panicum		Vol. P	'AZO
lene, Stoud		5 5	? muricatum, Retz		vii.	26
lepidotum, Steud	. ,,	25	musciparum, Linn		"	46
leptochloa, Nees		76	muticum, Forsk	•••	"	34
limosum, Presl		31	myosuroides, Br		"	42
lineare, Burm		289	myosurus, Rich	vi	i. 40,	41
lineare, Krock		17	myurum, Lamk	٧i	i. 40,	41
Linkianum, Kunth		13	myurum, Moyor		vii.	3 9
longeracemosum, Stend	. ,,	67	myurum, Wight		,,	43
longiflorum, Gmel		18	Myurus, <i>H. B. K</i>		"	39
longipes, W. & A		59	nanum, Nees		,,	34
longipes, W. & A		49	natans, Koen		,,	50
longisetum, Poir		88	Neesianum, W. & A.	•••	,,	47
longisetum, Torr		31	nemorosum, Trin	•••	"	58
lutescens, Weig	. ,,	79	nepalense, Spreng		"	55
luteum, Guldenst	. ,,	79	nervosum, Heyne		"	42
madagascarense, Spreng.	"	43	nervosum, Rottl		,,	16
malacceme, Trin		246	nervosum, Roxb		,,	55
mangaloricum, Steud		39	nervosum, Willd		"	15
marginatum, Heyne		21	neurodes, Schult		"	55
marginatum, Hb. Madr		37	nilagiricum, Steud		,,	34
marginatum, Vahl		83	nodibarbatum, Hochst.	•••	"	25
maritimum, Hort		78	nodosum, Kunth		"	43
mauritianum, Willd.	vii. 55	5, 56	notabile, $Hk. f. \dots \dots$,,	32
maximum, Jacq	vii	49	? notatum, Duthie		,,	47
maximum, Wallvii.		2, 54	? notatum, Wight		,,	53
	. vii.	65	nudiglume, Hochst		11	36
megiston, Schult	. ,,	49	numidianum, Lamk.		,,	35
mel-frugum, Hort		78	numidianum, Presl		"	32
Meneritana, Spreng	. ,,	25	numidianum, Sieb	•••	19	30
Menieri, Koen	. ,,	46	nutans, Rottl		,,	37
Metzii, Hochst		21	obliquum, Moritz		,,	21
Meyerianum, Neos	٠,,	3 5	obliquum, Roth	• • •	"	57
micrognostum, Stead		54	orientale, Willd	•••	"	86
microstachyum, Lamk	. ,,	41	orientale, Willd orthum, Voigt	•••	,,	59
miliaceum, Linn		45	oryzinum, Gmel	• • •	,,	31
miliaceum, Blanco		78	oryzoides, Sw	• • • •	,,	39
miliacoum, Thw		46		vii.	44, 2	47
miliare, Lamk	. ,,	46	oryphyllum, Hochst.	•••	"	57
miliare, Wall	vii. 26	, 47	pabulare, Aitch. & Hem			
Milium, Pers	. vii.	45			. 13,	
minimum, Wall	. ,,	79	pallens, Sw	•••		60
minutulum Gaud	٠ ,,	25	palmifolium, Koen	•••	••	55
mirabile, Braun	. ,,	31	palmifolium, Poir	•••	,,	55
molle, Griseb	. ,,	35	paludosum, Hochst.	• • •	"	50
molle, Sw	. ,,	35	paludosum, Roxb	•••	"	50
montanum, Roxb	. ,,	53	pamplemoussense, Steud	•	,,	49
? montanum, Dathie	. ,,	23	papillosum, Fensl	•••		35
montanum, Ham	• ,,	252	paractaenioides, Trin.	•••	-,	56
mucronatum, Heyne	. ,,	47	paradoxum, Rottl	• • •	"	59
mucronatum, Roth	. ,,	29	paraguayense, Stoud.	•••	"	85
mucronatum, Wall		47	parvulum, Trin	•••	11	18
multibrachiatum, Hochst.	,,	20	paspaloides, Pers	•••	37	30
multiflorum, Roxb	. ,,	42	paspaloides, Heyne	•••	øj.	35
multinode, Lamk	. ,,	50	paspaloides, Wall	•••	**	29
multinode, Presl	. ,,	43	patens, Linn	•••	**	57
multisetum, Hochst	. ,,	68	patens, Bojer	•••	"	40
muricatum, Michx	. ,,	31	patens, Roxb	•••	"	25

· · · · ·					
Panicum	Vol. 1		Panicum	Vol.	
paucisetum, Steud	vii.	55	quinquangulare, Ham.	vii.	
	,,	79	racemosum, Heyne	,,	15
peninsulanum, Stoud	,,	67	radicans, Bühse	···· ' ,,	57
	,,	16	radicans, Retz	,,	57
Perrottetii, Kunth	,,	26	radicosum, Presl	,,	13
Petiveri, Kotschy	,,	32	ramosum, Linn	,,	36
Petiverii, Thw	,,	38	ramosum, Heyne	٠ ,,	59
Petiverii, Trin vii.	34, 36	, 38	ramosum, Koep	50	47
phalaroides, R. & S	vii.	41	reclinatum, Vill	,,	80
phleoides, Br	,,	41	relaxatum, Nees	*** ,,	38
- · · · · · · · · · · · · · · · · · · ·	,,	35	remotum, Retz	,,	38
pictum, Koen	,,	32	repens, Linn	,,	49
pilipes, Nees & Arn	,,	57	repens, Burm	,,	34
pilosum, Dalz. & Gibs	,,	31	repens, Heyne	, ,,	57
pilosum, Rozb. & Heyne		45	repens, Roxb vii. 3	4, 35, 37	, 59
·7 7 · 6 · 37	•• ••	24	repens, Thw	vii.	50
plicatum, Lamk	v ii. 55	. 81	repens, Wight	,,	37
mlumosum Prosi	vii.	65	respiciens, Hoohst	*** ,,	80
· · · · · · · · · · · · · · · · · · ·		91	reticulatum, Thw	,,	48
polygamum, Hb. Madr	,,	52	rhabdinum, Steud	,,	23
	,,	49	rhachitrichlium, Hochst		56
	•• ,,	25	rhignon, Steud		24
	,,	18	Ridleyi, Hack		39
	•• **	50	rigidum, Heyne	,, vii. 47	
	,,			,, 34	21
	,,	79	Rothii, Spreng	,, 01	15
	,,	87	Rottleri, Kunth	,, 18	
	,,	47	Rottleri ?, Wight	vii.	16
	,,	49	Roxburghianum, Schul	t. "	50
	,,	34	Rowburghii, Spreng.	,,	47
	,,	50	Royleanum, Nees	,,	47
	,,	18	rude, Lamk	,,	80
prostratum, Lamk	vii. 3 3	, 34	sabulicolum, Nees	,,	31
prostratum, Thw	vii.	37	saccharoides, Trin	٠.,	65
	,,	52	Sama, Ham	,,	29
pruriens, Fisch	vii. 13	, 15	sanguinale, Burm	,,	33
	vii.	32	sanguinale, Linn	,,	13
Pseudo-Duroa, Nees .	,,	18	sanguinale, Pollich	,,	17
Pseudo-oryzoides, Steud.		39	sanguinale, Str. & Wint	. ,,	15
Pseudo-setaria, Steud.	•		sanguinale, Wall	vii. 14	, 15
	,,		sarmentosum, $Roxb$.	vii.	54
- ` · · · · · · · · · · · · · · · · · ·	•• ,,	59	sarmentosum, Hasek.	,,	35
		80	sarmentosum, Wight	,,	50
	", vii. 26		saxatile, Steud	*** "	22
	vii.	36	scabrum, Lamk	,,	31
		50	secundum, Heyne	,,	247
* . *	,,	46	secundum, Rottl	•	40
	,,	19	segetale, Roxb	**	32
	,,	28	semi-alatum, Br	,,	64
	,,	246	semiverticillatum, Rote	··· "	38
	,,	78	semiverticillatum, Rott		32
F	,,				
	•• ,,	79	semiverticillatum, Wigh		
	,,	29	sericeum, Boland	vii.	60
	,,	35	serotinum, Hort	,,	78
	,,	80	serratulum, Ham	*** ,,	39
	,,	35	serratulum, Roxb	,,	39
pyramidale, ? Ham.	.,,	75	setaceum, Hort	,,	78
quale Linnei, Krock	•• ,,	80	setarium, Lamk	"	66

D			. D	•		_
Panicum		Page	Panicum		Vol.	
setigerum, Retz	V 1	i. 36	turgidum, Forsk	•••	₹ii.	44
setigerum, Retz. & Roxb.	,,	34	turritum, Thunb	•••	"	41
setigerum, Roxb	"	34	uliginosum, Roth	•••	- 33	41
setosum, Hort	"	78	? uliginosum, Roxb.	•••	,,	50
sibiricum, Hort	,,	78	●umbrosum, Retz			36
Sieberi, Link	"	34	umbrosum, Retz. & Ro	xb. v	7ii. 34	ł, 36
simplicissimum, Koen	,,	60	uncinatum, Raddi		vii.	
simpliciusculum, W. &. A.	,,	271	undatum, Steud		,,	· 67
simplex, Rottl	"	-16	undulatifolium, Ardu	in.	,,	66
sordidum, Thw	,,	62	unguinosum, Hb. Ban		,,	67
sparsicomum, Nees	"	58	vacillans, Steud		"	54
spicatum, Roxb	"	82	vaginatum, Gren. & G		,,	13
spiciforme, Hochst	"	41	velutinum, Willd		"	57
spinescens, Br	"	62	Ventenatii, Stoud		,,	79
T		62	verticillatum, Linn.		"	80
T	"	96	verticillatum, Rottl.		"	79
Tr.	"	41	restitum, Nees			34
	"	31	viatioum, Griff		,,	64
stagninum, Rotz	"	43			"	34
stenostachyum, Thw	**	45		•••	"	60
striatum, Spreng	"		vicinum, Baily	•••	"	41
strictum, Roxb	"	75	vilfoides, Trin	•••	"	34
subalbidum, Kunth	"	52	vitlosum, Lamk	•••	"	65
subcordatum, Roth	**	34	villosum, Presi	•••	"	
subcordatum, Wight	**	37	violaceum, Kleine	•••	17	25
subeglume, Trva	,,	51	violoceum, Llanos	• • • •	"	43
subquadriparum, Trin	"	37	vire cens, Salzm	•••	11	80
sulcatum, Aubl	17	55	virgatum, Roxb	•••	,,	47
sumatrense, Roth	,,	46	viride, Desf	•••	"	80
sylvaticum, Lamk	,,	67	viride, Linn	•••	"	80
tejucense, Noos	"	80	viride, Poll		,,	79
tenellum, Griff	,,	48	rulgare, Wallr		17	78
tenellum, Roxb	"	47	vulpinum, Willd		"	88
Teneriffæ, Br	. ,,	65	Walkeri, Steud		11	26
	ii. 5	2. 60	Wallichianum, Nees		"	55
tenuistorum, Br	vii.	´ 18	Wallichianum, W. & A	.	,,	20
tenuistorum, Hort		249	Walteri, Pursh		,,	31
tenuifolium, Heyne	"	15	Wightianum, Arn. & I	lees	,,	28
3.7	"	248	Wightii, Nees		,,	28
4	"	17	Willdenowii, Steud.		"	82
	"	32	zcylanicum, Arn	•••	"	76
tetrastichum, Forsk	"	56	zizanioides, H. B. K.		"	39
Thouarsianum, Nees	,,	54	Zollingeri, Steud		"	22
tjicoyaense, Steud	"	80	zonale, Presl	•••	"	32
i tomentosum, Roxb	"					89
Torreyanum, W. & A	"	51 60	sp., Grin sp., Hk. f. & T	•••	"	42
trachypus, Trin	"	60	sp., Wall. vii. 14, 15, 1	9 25	₹. #2.	
tricarinatum, Steud	"	44	34, 35, 36, 37, 38, 39,	40 4	1 42	44
trichocondylum, Steud	"	49	48 47 49 50 58 54	10, 1	57.	5H.
trichopus, Hochst	"	35	46, 47, 48, 50, 58, 54	., OU	246,	332
triflorum, Edgew	"	60				782
trigonum, Retz	,,	56	Panisea, Lindl	•••	₹.	783
trigonum, Thw	"	57	apiculata, Lindl	•••	**	783
trinapalium, Ham	,,	53	parviflora, Lindl	•••	**	7
Trinii, Mor	"	58	reflexa, Lindl	•••	**	783
triticoides, Poir	• "	87	uniflora, Lindl	•••	"	842
truncatum, Trip	"	30	Papaver, Linn	•••	1.	116
trypheron, Schult	"	47	amænum, Lindl	•••	"	117
tuberculatum, Presl	,,	49	Argemone, Linn	•••	49	117
, , , , , , , , , , , , , , , , , , , ,			-			

_ `			-
Papaver	Vol.		Paramignya Vol. Page
dubium, Linn	1.	117	grandiflors, Oliv i. 510
glabrum, Royle	"	117	Griffithii, Hk. f " 510
hybridum, Linn	"	117	longispina, $Hk. f. \dots , 511$
nudicaule, Linn	"	117	monophylla, Wight , 510.
orientale, Linn	,,	117	Parapottsia, Miq iii. 652
paniculatum, D. Don	"	119	Parartabotryssumatrana, Miq. i. 83
Rhoeas, Linn		117	Parashorea longisperma, Kurz i. 308
simplicifolium, D. Don	,,	118	stellata, Kurz ,, 304
somniferum, Linn	"	117	Parastemon, A. DC ii. 312
PAPAVERACEÆ	i.	116	urophyllum, A. DC ,, 312
Papeda Rumphii, Cat. Hort			Paratropia capitata, W. & A.
Bog		515	ii. 731, 732
PAPILIONACEE	ii.	56	elliptica, Miq " 729, 780
Pappophorum, Nees	, vii.	301	heterophylla, Presl ii. 731
? arabicum, Hochst	, ,,	302	macrantha, Miq ,, 729
Aucheri, J. & Sp		301	micrantha, Miq ,, 780
brachystachyum, J. & Sp.		302	subulata, Miq ,, 730
elegans, Nees		301	terebinthacea, Arn " 730
? nanum, Steud	, ,,	302	venulosa, W. & A ,, 729
persicum, Steud	, ,,	301	Wallichiana, W. & A , 730
robustum, Hk f	••	302	Pardanthus chinensis, Ker vi. 277
turcomanicum, Trautv		301	nepalensis, Sweet ,, 277
vincentianum, Schmidt	,,	302	Parietaria, Tournef v. 592
? sp., Wall		270	bracteata, Wight ,, 585
Papularia crystallina, Forsk		660	debilis, Forst ,, 593
Papyrus corymbosus, Nees		613	indica, Linn ,, 581
dehiscens, Neos	•	613	judaica, Linn ,, 592
		618	to Talah : 500
		619	509
latifolius, Willd Pangorei, Nees vi	. 612		121-11 D1
		618	seylanica, Linn ,, 581
		617	Parilium Arbor-tristis, Gærtn. iii. 603
venustus, Schrad	± .	95	Parinarium, Juss ii. 308
Parabæna, Miers		96	910
ferruginea, Miers		96	1 162 " 010
heterophylla, Miers	••	98	2000 · 2000
oleracea, Miers		96	
sagittata, Miers	•	160	
Paracaryum, Boiss		161	Oniththianum Bouth 910
anchusoides, Benth. & Hook		160	Uniter Ul. 4 911
omlestinum, Benth		161	7 77
glochidiatum, Benth		161	P Jackianum, Benth. ii 309, 312
heliocarpum, A. Kerner		162	
himalayense, Clarke		161	
P Lambertianum, Clarke		160	_L1
malabaricum, Clarke			
microcarpum, Boiss	**	162	polyneurum, Miq ,, 309
Thomsoni, Clarke		161	salicifolium, Benth ,, 810
tibeticum, Clarke	. ;	162	sumatranum, Benth. ii. 309, 310
Paracelastrus bivalvis, Miq	. i.	614	sumatranum, Kurs ii. 311
Paragnathis pulchella, Spreng	ł. <u>w</u> i.	167	travancoricum, Bedd ,, 811
Parameria, Benth	, iii.	659	Wallichianum, Wall , 311
glandulifera, Benth	. ,,	660	Paris, Linn vi. 362
polyneura, Hk. f	•	660	Daisun, Ham ,, 362
Paramignya, Wight	. i.	509	imperialis, Jacquem ,, 862
armata, Oliv	. ,,	511	polyphylla, Sm ,, 362
citrifolia, Hk. f	. ,,	510	Parishia, Hk. f ii. 29
citrifolia, Oliv	. ,,	510	insignis, Hk. f ,, 30

Manufallia.		_	D			_
Parishia		Page	Parsonsia		Vol.	Page
Maingayi, Hk . f	íi.	30	acuminata, Wall	• • •	111.	650
pubescens, Hk. f	,,	30	barbata, Bl		"	660
Paritiilm gangeticum, G. Don	i.	345	oblongu, Wall		"	650
tiliaceum, W. & A	,,	343	ovata, Wall		,,	652
tricuspe, G. Don		344	pauciflora, Well		,,	650
Parkia, R. Br	ii.	289	spiralis, Wall			850
1. 1. 1		289	Parthenoxylon porrectum,	ВI	v.	136
	"	289			٧.	
biglobosa, Benth	"		Pseudo-sassafras, Bl.	• • •	?"	136
Brunonis, Grah	"	289	Parvatia, Done	•••	1.	108
insignis, Kurz	,,	2 90	Brunoniana, Dene		"	108
leiophylla, Kurz	,,	289	Paspalum, Linn		vıi.	10
Roxburghii, G. Don	"	289	adpressum, Pers		,,	30
Parkinsonia, Linn	ii.	260	ægyptiacum, Poir		"	13
- aniant- Time		260	alternans, Steud			11
	."	609		•••	**	17
Parnassa, Jones	iv.		ambiguum, DC	•••	"	20
Parnassia, Linn	ii.	401	annulatum, Finegge	•••	"	
affinis, Nk. f. & T	"	403	auriculatum, Presl	•••	"	11
cabulica, Planch	"	403	bicorne, Lam		77	13
foliosa, Hk. f. & T	"	402	bicrurulum, Saltzm.		,,	11
foliosa, Drude		402	bicrurum, Saltzm		"	12
7	"	403	bifarium, Edgew		ii. "1]	
	"	403	blepharophorum, R. &			. 13
maisorensis, Hend	"				A 11	12
mysorensis, Heyne	" "	402	brachiatum, Trin		"	
nubicola, Wall	j,	402	brevifolium, Fluegge	• • •	17	18
Nummularia, Drude	"	402	cartilagineum, Presl	•••	"	11
ornata, Wall	"	402	chinense, Nees		"	18
ovata, Ledeb	,,	403	ciliare, DC		,,	13
and the shade of the se		401	ciliare, Retz		"	15
	"	403	ciliatifolium, Trin			12
pusilla, Wall	"	402	allintum Tam	•••	,,	12
Schmidii, Zenker	"		ciliatum, Lam	•••	"	11
subacaulis, Kar. & Kir	,,	403	coloratum, Rich	•••	"	
tenella, Hk . f . \mathcal{F} T	,,	103	Commersoni, Lamk.	•••	"	11
trinervis, Drude	,,	403	compactum, Roth	• • •	,,	12
Turczaninovii, Led	"	403	concinnum, Steud	•••	"	19
. Wightiana, Wall		402	conjugatum, Berg		,,	11
- ' · · · · ·	ii.	86	consanguineum, Kunth		"	13
		86	coromandelianum, Lam			11
communis, Ham	"				"	18
maculata, R. Br	"	87	corymbosum, Kunth	•••	"	12
major, D. Don	,,	86	costatum, Hochst	•••	"	
oxalidifolia, Royle	,,	87	Dactylon, DC	•••	"	289
Paronychia bengalensis, R.			debile, Poir	•••	,,	16
& S	iv.	731	depressum, Steud		"	12
subulata, Lamk	j.	245	didactylum, Saltzm.		,,	12
	i٧.	712	Digitaria, Poir		,,	12
		,	dimidiatum, Linn			11
Parophiorrhiza khasiana,		70			"	294
Clarke iii. 85), <u>.</u> !V	. 18	dissectum, Kniphof	•••	77	11
Paropsia, Noronh malayana, Planch	ii.	600	dissectum, Linu	•••	"	
malayana, Planch	,,	600	distachyon, Willd	• • •	"	12
vareciformis, Mast	"	600	distans, Necs	•••	"	13
Parrottia, C. A. Meyer	• •	426	distichum, Linn		,,	12
Jacquemontiana, Dene		426	dolichopus, Trin		"	12
Разума Ве	;"	131	eriophorum, Willd			12
Parrya, Br exscapa, Meyer	1.	131	Fernandesianum, Colla		**	12
exscapa, meyer	"				"	18
lanuginosa, Hk. f. & T	"	132	filiculme, Nees	•••	"	
macrocarpa, Br	"	131	filiculme, Str. & Wint.	• • •	"	18
macrocarpa, Br platycarpa, Hk. f. & T Parsonsia. Br	,,	131	filiforme, Steud		,,	13
Paraonsia, Br	iii,	650	firmum, Trin		,,	11

Pappaium Vol. Page Sissifolium, Nees vii. 12 Revuosum, Klein 11 Ruitums, Ell. 20 Frumentaceum, Rottb. 11 furcatum, Fluegge 20 Furmentaceum, Rottb. 11 furcatum, Fluegge 12 granulare, Trin. 12 granulare, Trin. 12 granulare, Trin. 12 granulare, Trin. 12 thirsutum, Poir 12 hirsutum, Poir 12 hirsutum, Poir 12 hirsutum, Retz. 11 Houttuynii, H. C. Hall 11 thunifusum, H. H. f. 16 hirsutum, Heyne 17 trachyanthum, Nees 19 inrequale, Link 13 tristachyum, Leonte 12 ternatum, H. f. 17 Thunbergii, Kunth 11 Kora, Viild 12 truchyanthum, Nees 19 tristachyum, Leonte 12 truchyanthum, Reiz. 12 tongistorum, Retz. 13 tongistorum, Retz. 14 tongistorum, Retz. 15	Paspalum .	,	U 01 1	Parra	Paspalum		V ol	Page
Revisoum Klein	fissifolium Nees							
Futtuns, Ell.								
Surcatum, Fluegge 12 12 13 14 15 16 17 16 17 18 19 17 18 19 18 19 18 19 18 19 18 19 18 19 18 19 18 19 18 19 18 19 18 19 19	favorant groups Dotth							
geniculatum, Heyne vii 18, 12 granulare, Trin. vii 18, 12 granulare, Trin. vii 18, 12 heteranthum, Hk. f. 16 hirsulum, Poir. 12 hirsulum, Retz. 11 Houthuynii, H. C. Hall 11 Hounifusum, Heyne 17 inwayale, Link 13 ischnocaulton, Trin. 19 jubatum, Grizeb 19 Keinianum, Fresl 12 Kora, Forst. 11 Kora, Forst. 12 Longiflorum, Retz. 12 Longiflorum, Retz. 12 Longiflorum, Retz. 13 Longiflorum, Retz. 14 Longifloium, Roxb 11 Longissimum, Hochst. 12 maculosum, Trin. 12 maculosum, Trin. 12 maculosum, Trin. 12 maculosum, Trin. 12 mounitanicum, Nees 11 Michausianum, Kunth 12 miliaria, C. Muell. 11 menatodes, Schult 18 notatum, Fluegge 12 obtusfolium, Trin. 12 notusatum, Nees 12 notusatum, Nees 12 pobtusfolium, Trin. 12 policulare, Forst. 11 menatodes, Schult 18 notatum, Fluegge 12 obtusatum, Nees 12 poticulare, Forst. 11 pubescens, Mahlb 12 porteenstm, Trin. 19 pedicallatum, Nees 19 protenstm, Trin. 19 potry gens, Arn 11 pubescens, Minhb 12 punctatum, Fluegge 20 proteins, Senge 21 proteinstm, Fluegge 20 proteins, Senge 31 proteinstm, Fluegge 32 proteinstman, Fluegge 33								
		•••	"				"	
Griffithianum, C. Mull		•••	. "	12			"	
heteranthum, Hk. f. 16 hirsulum, Poir. 12 hirsulum, Poir. 12 tene, Geertn. 13 tene, Geertn. 14 tene, Geertn. 15 tene, Geertn. 16 tene, Geertn. 17 tene, Geertn. 17 tene, Geertn. 17 tene, Geertn. 17 tene, Geertn. 18 tene, Geertn. 18 tene, Geertn. 18 tene, Geertn. 19 tene, Geertn. 17 tene, Geertn. 17 tene, Geertn. 18 tene, Geertn. 19 tene, Geertn. 12 tene, Geertn. 19 trackpanthum, Nees 19 trackpanthum, Nees 19 trackpanthum, Lan. 289 trackpanthum, Steud. 11 trackpanthum, Steud. 11 trackpanthum, Steud. 11 trackpanthum, Steud. 11 trackpanthum, Steud. 12 tone, Geertn. 13 tone, Geertn. 14 tone, Geertn. 14 tone, Geertn. 12 tone, Geertn. 14 tone, Geertn. 14 tone, Geertn. 14 tone, Geertn. 14 tone, Geertn. 12 tone, Geertn. 14 tone,						•••	>>	
hirsutum, Poir.		•••	VII.			•••	"	
hirsutum, Retz.		•••	"			•••	"	
Houttuynii, H. C. Hall		•••	"			•••	"	
	hirsutum, Retz	•••	"				"	
inwquale, Link	Houttuynii, H. C. Hall		"			• • •	"	
inequale, Link	humifusum, Heyne	•••	,,	17	trachyanthum, Nees	• • •	,,	
	inæquale, Link	• • • •		13	tristachyum, Leconte	•••	17	
jubatum, Griseb. 19	ischnocaulon, Trin			19	umbellatum, Lam		"	
Remainstant	jubatum, Griseb			19	vaginatum, Sw		,,	12
Rora, Forst. 12 Rora, Forst. 13 Rora, Willd. 11 sp., Griff. 19 19 19 19 19 19 19 1				12	venustum, Forst. f			11
Sp. Griff. 19 Sp. Wall. vii. 11, 18, 19 Sp. Wall. vii. 12, 13 Sp. Wall. vii. 11, 18, 19 Sp. Wall. vii. 12, 13 Sp. Wall. vii. 14, 19 Sp. Wall. vii. 12, 13 Sp. Wall. vii. 14, 19 Sp. Wall. vii. 14, 19 Sp. Wall. vii. 14, 19 Sp. Wall. vii. 12, 13 Sp. Wall. vii. 14, 19 Sp. Wall. vii.				12				11
	Kora, Willd			11				19
Paspalus sp., Wall. Vii. 12, 13	littorale. Br.				sp. Wall.	vii. l	1. 18	3, 19
Passerina annua, Wikstr. V. 194	longiflorum, Retz.				Paspalus sp., Wall	▼:	ii. la	2, 13
	longiflorus Retz							
maculosum, Trin. "12 racemosa, Wikstr. "196 mauritanicum, Nees "11 Stelleri, Wikstr. "196 metabolon, Steud. "11 Passiflora, Linn. "1599 Michauxianum, Kunth "12 caloneura, Kurz 600 Michauxianum, Kunth "12 geminifora, D. Don 600 miliaria, C. Muell. "12 geminifora, D. Don 600 mollipilum, Steud. "18 Heyneana, Wall. 600 mollipilum, Steud. "18 penangiana, Wall. 603 notatum, Fluegge "12 superosa, Linn. 599 obtusatum, Nees "12 walkeriæ, Wight "599 obtusifolium, Trin. "12 walkeriæ, Wight "599 porbiculare, Forst. "11 pedicellere, Trin. "19 pedicellare, Trin. "19 grandis, Dalz. "709 paniculatum, Jacq. "15 grandis, Dalz. Gibs. "715 pedicellare, Trin. "19 hoberiana, Wight "715 pennatum, Hk.f.								
maueritanicium, Nees " 11 Stelleri, Wikstr. " 196 metabolon, Steud. " 11 Passiflora, Linn. " 1599 Metzii, Steud. " 12 caloneura, Kurz 600 Michauxianum, Kunth " 12 fatida, Linn. 599 miliaria, C. Muell. " 12 geminifora, D. Don 600 miliaria, Steud. " 18 Heyneana, Wall. " 600 mollipilum, Steud. " 11 nepalensis, Wall. " 600 nematodes, Schult. " 18 nepalensis, Wall. " 600 notatum, Fluegge " 12 sinyaporeana, Wall. " 603 notatum, Lam. " 12 walkeriæ, Wight. " 599 obtussifolium, Trin. " 12 walkeriæ, Wight. " 599 obtusifolium, Trin. " 12 pastinaca Candolleana, W.& A. ii. 715 owyanthum, Steud. " 13 grandis, Dalz. & Gibs. " 710 pedicellare, Trin. " 19 Hookeriana, Wight. " 715 pedicellarum, Nees. " 19 Hookeriana, Wight. " 715								
metabolon, Steud. " 11 Passiflora, Linn. ii. 599 Metzii, Steud. " 11 caloneura, Kurz 600 Michauxianum, Kunth " 12 geminifora, D. Don 600 miliaria, C. Muell. " 12 geminifora, D. Don 600 mollicomum, Steud. " 18 Heyneana, Wall. 600 mollipilum, Steud. " 12 nepalensis, Wall. 600 notatum, Fluegge " 12 sinyaporeana, Wall. 603 notatum, Fluegge " 12 suberosa, Linn. 599 obtusatum, Nees " 12 suberosa, Linn. 599 obtusatum, Nees " 12 yalkeriæ, Wight " 599 obtusifolium, Trin. " 12 pastinaca Candolleana, W. & A. ii. 715 owyanthum, Steud. " 13 glauca, Dalz. " 709 paniculatum, Steud. " 13 grandis, Dalz. & Gibs. " 710 pedicellare, Trin. " 19 Hookeriana, Wight " 715 pedicellarum, Nees " 19 ligusticifolia, Wight " 715 perinceov, Walt.			"		O4-11: Wilests			
Metzii, Steud. " 11 caloneura, Kurz 600 Michauxianum, Kunth " 12 fatida, Linn. 599 miliaria, C. Muell. " 12 geminifora, D. Don 600 miliaria, C. Muell. " 18 Heyneana, Wall. 600 mollicomum, Kunth " 35 Leachenaultii, DC. 599 mollipilum, Steud. " 18 heyneana, Wall. 600 nematodes, Schult. " 18 penangiana, Wall. 603 notatum, Fluegge " 12 suberosa, Linn. 603 notatum, Lam. " 12 suberosa, Linn. 599 obtusatum, Nees " 12 suberosa, Linn. 599 obtusifolium, Trin. " 12 potusifolium, Wall. " 599 orbiculare, Foret. " 11 glauca, Dalz. " 1598, 599 Pastinaca Candolleana, W.& A. ii. 715 glauca, Dalz. " 715 pandiculatum, Jacq. " 15 grandis, Dalz. & Gibs. " 716 pedicellare, Trin. " 19 hookeriana, Wight. " 715 pennatum, Hk.f.			"					
Michankianum, Kunth "12 fatida, Linn. "599 miliaria, C. Muell. "12 geministora, D. Don "600 minutistorum, Steud. "18 Heyneana, Wall. "600 mollicomum, Kunth "35 Leschenaultii, DC. "599 mollipilum, Steud. "11 nepalensis, Wall. "600 nonatodes, Schult. "18 penangiana, Wall. "601 nutans, Lam. "12 suberosa, Linn. "599 obtusatum, Nees "12 obtusifolium, Trin. "12 obtusifolium, Trin. "13 glauca, Dalz. "709 paniculatum, Steud. "13 glauca, Dalz. "709 paniculatum, Jacq "15 pedicellare, Trin. "19 pedicellare, Trin. "19 pedicellarum, Nees "19 pennatum, Hk.f. "16 rigens, Wight "715 pennatum, Hk.f. "20 Sprengeliana, Wight "715 pennatum, Hk.f. "20 Sprengeliana, Wight "715 polystachyum, Br. "11 polystachyum, Br. "12 polystachyum, Br. "12 potystachyum, Br. "12 protensum, Trin. "12 protensum, Trin. "12 protensum, Trin. "12 pubescens, Arn "12 pubescens, Br. "11 pubescens, Br. "11 pubescens, Muhlb. "12 pubescens, Muhlb. "12 puncatum, Fluegge" "20 Pattonia asiatica, Linn. "497 Renggeri, Steud. "12 Pavetta, Linn. "497 Renggeri, Steud. "12 Pavetta, Linn. "481		•••	"					
miliaria, C. Muell. "12 miliaria, C. Muell. "18 miliaria, C. Muell. "19 mollipilum, Steud. "11 nepalensis, Wall. "600 nematodes, Schult. "18 notatum, Fluegge "12 nutans, Lam. "12 nutans, Lam. "12 nutans, Lam. "12 nutans, Lam. "12 obtusatum, Nees "12 obtusifolium, Trin. "12 owyanthum, Steud. "13 paniculatum, Jacq. "15 pedicellare, Trin. "19 pedicellare, Trin. "19 pedicellarum, Nees "1	Metzii, Steud	•••	"					
minutiforum, Steud. "18		•••	**		Jænaa, Linn		"	
mollicomum, Kunth , 35 Leschenaultii, DC. , 599 mollipilum, Steud , 11 nepalensis, Wall. , 600 penanqiana, Wall. , 603 notatum, Fluegge , 12 subgrosa, Linn. , 599 obtusatum, Nees , 12 Walkeriæ, Wight , 599 obtusifolium, Trin. , 12 paniculatum, Jacq , 15 grandis, Dalz. & Gibs. , 710 pedicellare, Trin. , 19 pedicellarum, Nees , 19 pennatum, Hk.f. , 16 pennatum, Hk.f. , 20 platycaule, Willd , 12 polystachyum, Br. , 11 protensum, Trin. , 12 protensum, Trin. ,		•••	77		geminylora, D. Don		"	
mollipilum. Steud, 11 nepalensis, Wall, 600 nematodes, Schult, 18 notatum, Fluegge, 12 nutans, Lam, 12 nutans, Lam, 12 nutans, Linn, 599 obtusatum, Nees, 12 obtusifolium, Trin, 12 paniculatum, Steud, 13 paniculatum, Steud, 15 pedicellere, Trin, 19 pedicellere, Trin, 19 pedicellatum, Nees, 19 pennatum, Hk.f, 16 perrottetii, Hk.f, 20 platycaule, Willd, 12 polystachyum, Br, 11 potystachyum, Br, 11 potensum, Trin, 12 protensum, Trin, 12 pubescens, Br, 11 pubescens, Muhlb, 12 pubescens, Muhlb, 12 puperulum, Fluegge, 20 Pattonia asiatica, Linn, 210 pattonia asiatica, Linn, 247 Renggeri, Steud, 12 Pavetta, Linn, 497 Renggeri, Steud, 12 Pavetta, Linn, 497 Pavetta, Linn, 497		•••	"		Heyneana, Wall		"	
nematodes, Schult	mollicomum, Kunth	•••	"				"	
		•••	,,			• • • •	,,	
nutan, Iann	nematodes, Schult	•••	,,			•••	"	
obtusatum, Nees "12 Walkeriæ, Wight "599 obtusifolium, Trin. "12 pastinaca Candolleana, W.& A. ii. 715 owyanthum, Steud. "13 glauca, Dalz. "709 paniculatum, Jacq. "15 pedicellere, Trin. "19 hookeriana, Wight "715 pedicellatum, Nees "19 ligusticifolia, Wight "715 pennatum, Hk.f. "16 rigens, Wight "715 pennatum, Hk.f. "20 platycaule, Willd "12 polystachyum, Br. "11 poviese, Arn "12 process, Arn "12 process, Arn "12 process, Arn "12 process, Malt. "289 process, Rr. "11 pubescens, Br. "11 pubescens, Br. "11 pubescens, Muhlb. "12 processens, Br. "11 pupescens, Muhlb. "12 processens, Muhlb. "12 processens, Br. "11 pupescens, Muhlb. "12 processens, Br. "11 processens, Muhlb. "12 processens, Br. "11 processens, Muhlb. "12 processens, Muhlb. "14 processens, Muhlb. "15 processens, Muhlb. "16 processens, Muhlb. "17 processens, Muhlb. "18 processens, Muhlb. "19 processens,	notatum, Fluegge	•••	,,			••	"	
obtusifolium, Trin. " 12 Passiflorre. " 1.598, 699 orbiculare, Forst. " 11 Pastinaca Candolleana, W.& A. ii. 715 owyanthum, Steud. " 15 glauca, Dalz. " 709 pedicellatum, Jacq. " 15 grandis, Dalz. & Gibs. " 710 pedicellatum, Nees. " 19 Hookeriana, Wight. " 715 pennatum, Hk.f. " 16 Sprengelian, Wight. " 715 Perrottetii, Hk.f. " 20 Sprengeliana, Wight. " 716 platyeaule, Willd. " 12 sp., Hk.f. & T	nutans, Lam		,, ,		suberosa, Linn	•••	"	
orbiculare, Forst. "11 Pastinaca Candolleana, W.& A. ii. 715 owyanthum, Steud. "13 glauca, Dalz. "709 paniculatum, Jacq. "15 grandis, Dalz. "715 pedicellare, Trin. "19 Hookeriana, Wight. "715 pennatum, Hk.f. "16 ligusticifolia, Wight. "715 Perrottetii, Hk.f. "20 Sprengeliana, Wight. "715 polystachyum, Br. "11 Patonia parvifolia, Wight. i. 84 porrigens, Arn "12 Patonia parvifolia, Wight. i. 84 procor, Walt. "289 Patinia, Juss. "iii. 210 protensum, Trin. "12 gravcelens, Hance. "210 puberulum, R. & S. "11 pubescens, Br. "11 pubescens, Muhlb. "12 pattonia macrantha, Wight. "210 puncatum, Fluegge "20 Pattonia macrantha, Wight. "12 puncatum, Fluegge "20 Pattonia macrantha, Wight. "12 Paullinia asiatica, Linn. "497 Renggeri, Steud. "12	obtusatum, Nees	•••	,,		Walkeriæ, Wight			
owyanthum, Steud. " 13 glauca, Dalz. " 709 paniculatum, Jacq. " 15 grandis, Dalz. " 710 pedicellere, Trin. " 19 Hookeriana, Wight. " 715 pedicellatum, Nees. " 16 ligusticifolia, Wight. " 715 pennatum, Hk.f. " 20 Sprengeliana, Wight. " 715 Perrottetii, Hk.f. " 20 Sprengeliana, Wight. " 716 sp. Hk.f. & T. ii. 711, 712, 713 Patonia parvifolia, Wight. ii. 84 porrigens, Arn. " 12 Walkeri, Wight. ii. 84 praecox, Walt. " 289 Patrinia, Juss. iii. 210 protensum, Trin. " 12 grarcolens, Hance. " 210 puberulum, R. & S. " 11 Jatamanşi, D. Don. " 211 pubescens, Muhlb. " 12 puncatum, Fluegge. " 20 princatum, Fluegge. " 20 Pattonia macrantha, Wight. " 18 reimarioides, Brongn. " 13 Paullinia asiatica, Linn. iii. 497 Renggeri, Steud. " 12 Pavetta, Linn. iiii. 14	obtusifolium, Trin		,,					
paniculatum, Jacq	orbiculare, Forst		,,	11	Pastinaca Candolleana, W	.& A	. ii.	
paniculatum, Jacq	owyanthum, Steud		"	13	glauca, Dalz	• • •	"	
pedicellare, Trin. " 19 pedicellatim, Nees " 19 pennatum, Hk. f. " 16 Perrottetii, Hk. f. " 20 platycaule, Willd " 12 polystachyum, Br. " 11 porrigens, Arn " 12 praecox, Walt. " 289 protensum, Trin. " 12 puberulum, R. & S. " 11 pubescens, Br. " 11 pubescens, Muhlb " 12 punctatum, Fluegge " 20 protensum, Fluegge " 20 protensum, Fluegge " 20 Renggeri, Steud. " 12 Pavetta, Linn. " 18 Pavetta, Linn. " 19 ligusticifolia, Wight " 715 rigens, Wight " 715 Sprengeliana, Wight " 18 Patonia parvifolia, Wight " 18 Patonia parvifolia	paniculatum, Jacq			15	grandis, Dalz. & Gibs.	• • •	"	
pedicellatum, Nees	pedicellare. Trin			19	Hookeriana, Wight		"	715
Perrottetii, Hk. f				19	ligusticifolia, Wight		,,	715
platycaule, Willd " 12 sp. Hk. f. & T 11. 711, 712, 713 polystachyum, Br				16	rigens, Wight		,,	715
platycaule, Willd " 12 sp. Hk. f. & T 11. 711, 712, 713 polystachyum, Br				20	Sprengeliana, Wight	•••	,,	
Patonia parvifolia, Wight 1. 84				12	$s\hat{p}$ $H\hat{k}$. f . de T ii.	711,	712,	713
Porrigens, Arn 12 Walkeri, Wight 1.84, III. 561				11	Patonia parvifolia, Wight	t	1.	54
praecox, Walt. " 289 Patrinia, Juss. 11. 210 protensum, Trin. " 12 graveolens, Hance " 210 puberulum, R. & S. " 11 Jatamanşi, D. Don " 211 pubescens, Br. " 11 monandra, Clarke " 210 pubescens, Muhlb. " 12 vata, Bunge " 210 punctatum, Fluegge " 20 Pattonia macrantha, Wight vi. 18 reimarioides, Brongn. " 13 Paullinia asiatica, Linn. ii. 497 Renggeri, Steud. " 12 Pavetta, Linn. * 149					Walkeri, Wight	i. 84	iii.	561
protensum, Trin. " 12 graveolens, Hance " 210 puberulum, R. & S. " 11 Jatamanşi, D. Don " 211 pubescens, Br. " 11 monandra, Clarke " 210 pubescens, Muhlb. " 12 ovata, Bunge " 210 punctatum, Fluegge " 20 Pattonia macrantha, Wight " 18 reimarioides, Brongn. " 13 Paullinia asiatica, Linn. i. 497 Renggeri, Steud. " 12 Pavetta, Linn. " 1149					Patrinia Juss		iii.	210
puberulum, R. & S " 11 pubescens, Br " 11 monandra, Clarke " 210 pubescens, Muhlb " 12 punctatum, Fluegge " 20 punctatum, Fluegge " 20 Pattonia macrantha, Wight vi. 18 reimarioides, Brongn " 13 Paullinia asiatica, Linn i. 497 Renggeri, Steud " 12 Pavetta, Linn iii 149			"					
pubescens, Br , 11 monandra, Clarke , 210 pubescens, Muhlb , 12 ovata, Bunge , 210 punctatum, Fluegge , 20 punctatum, Fluegge , 20 reimarioides, Brongn , 13 Renggeri, Steud , 12 Pavetta, Linn iii. 149								
pubescens, Muhlb, 12 ovata, Bunge, 210 punctation, Fluegge, 20 Pattonia macrantha, Wight vi. 18 reimarioides, Brongn, 13 Paullinia asiatica, Linn i. 497 Renggeri, Steud, 12 Pavetta, Linn iii. 149				1				- '
punctation, Fluegge, 20 Pattonia macrantha, Wight vi. 18 reimarioides, Brongn, 13 Paullinia asiatica, Linn i. 497 Renggeri, Steud, 12 Pavetta, Linn iii. 149	puvescens, Br							
Renggeri, Steud , 12 Paullinia asiatica, Linu i. 497 Renggeri, Steud , 12 Pavetta, Linu iii. 149				- 1	Dattomia massantha Win	h t		
Renggeri, Steud , 12 Pavetta, Linn iii. 149					Paulinia seistica finn		_	
			"		Pozotto Tinn	•••	:::	
repens, Koxb ,, 12 (Ackeringæ, Teysm. & Dinn. ,, 121			"		Ashaninan Manana & Di	inr	411.	144
	repens, Roxb	•••	97	12	Ackeringer, 1eysm. & Di		"	

Pavetta		¥ ¥	D	1 Demonie
-71- Tr-L1			. Page	Pavonia Vol. Page
mar mar = 4.56 x 7.5 m = 770 h = 11	•••	111		acerifolia, Lk. & Otto i. 338
angustifolia, Thw		_ "		arabica, Hochst 331
? aristata, Wall	iii.		4, 153	ceratocarpa, Dalz , 331
Bandhuca, Miq	•••	iii	. 145	glechomifolia, A. Rich ,, 330
brevifiora, DC		,,	151	grewioides, Hochst ,, 332
Brunonis, Wall		"	152	odorata, Willd ,, 331
Brunonis, Miq		,,	139	programbana Doing 220
Brunonis, Wight		"	150	propingue Garaka 220
? canarica, Bedd	•••	"	106	renanda Con 200
canescens, Wall			150	Rombonus Wall 991
cerberæfolia, Miq		"	102	Manage 197 - 11
coccinea, Bl		"	145	addaida II aan aan
? coffeacea, Wall.	•••	"	153	1
compactiflora, Kurz	• • •	"	158	
	•••	"	146	Payanelia (vide Pajanelia) iv. 381
	•••	,,	150	Payens, A. DC iii. 547
Finlaysoniana, Wall.	•••	"		Griffithii, Kurz " 543
fulgens, Miq	•••	25	146	lucida, A. DC , 547
Gleniei, Thw	•••	"	152	Maingayi, Clarke , 547
graciliflora, Wall	•••	"	150	malaccensis, Clarke , 547
hispidula, $W. S. A$	•••	"	151	paralleloneura, Kurz , 548
humilis, Hk. f	•••	,,	151	Pechea sub-cylindrica, Pourr. vii. 236
incarnata, Bl	•••	11	145	Pectis meifolia, Wall iii. 308
indica, Linn		,,	150	PEDALINE iv. 386
indica, Linn		,,	150	Pedalium, Linn iv. 386
indica, Wall		,,	150	Murex, Linn , 386
. involucrata, Thw		"	152	Pedicularis, Linn iv. 306
Lobbii, Teysm. & Binn.		,,	146	abrotanifolia, Bieb ,, 309
longifolia, Miq		,,	105	abrotanifolia, Hk. f. & T. , 369
? lucens, Br			106	Albanti Damal 210
macrocoma, Miq		"	143	applantifation Flameter 915
macrophylla, Bl		"	143	unalaniifalia Wall 215
		"	150	Saugua Wall
naucleiflora, Wall	•••	"	152	1 11 70 4
	•••	"	107	
nilagirica, Bedd ? oblonga, Wall	•••	"	153	huamifalia I) IIa. 207
roolonga, wall	•••	"	147	
opaca, Miq	•••	"	141	219
pendula, Miq	•••	"		
petiolaris, Wall.	•••	"	150	cheilanthifolia, Schreuk , 308
polyantha, Wall	•••	,,	150	Clarkei, Ilk. f , 310
Rothiana, DC	•••	"	150	comosa, Linn ,, 316
salicifolia, Bl	•••	12	146	ourvipes, IIk. f ,, 316
	•••	••	151	denudata, Hk . f , 309
subcapitata, Hk. f	• • •	;;	150	elephantoides, Bonth ,, 314
Teysmanniana, Miq.	•••	"	143	Elephas, Boiss ,, 314
tomentosa, Roxb	• • •	,,	150	Elwesii, <i>Hk. f.</i> , 312
velutina, Wall		,,	150	excelsa, Hk. f ,, 311
villosa, Heyne		,,	150	, eximia, Watt ,, 312
weberæfolia, Br	•••	,,	102	fissa, Turcz.? ,, 316
weberæfolia, Wall		,,	103	flagellaris, Benth ,, 315
T27 - 7 TEF - 33		,,	102	flexnoss, Hk. f ,, 308
7077 1 17 TTL A		"	152	infulaces, Wall ,, 316
107. 1 / 17		"	144	globifera, Hk.f ,, 308
נוֹנית י			106	gracilis, Wall ,, 307
		" i.	675	himalaica, Klotz ,, 313
7.7			675	U. C. sistani Vlata 219
		,,	675	Unahaminum (Wall) 919
		••	330	1-4
Pavonia, Cav	1	١.		integritoria, Hk. J ,, 505

M- 511-1		_	D-114b-s	
Pedicularis	•	Page	Peliosanthes	Vol. Page
	17.	808	Teta, Andr	vi. 265
	,,	313	Teta, Wall	, ,,
	,,	311	violacea, Wall	' ,, 266
	,,	307	violacea, Wall	,, 265
lasiostachys, Bunge	,,	318	Pellacalyz, Korth	ii. 440
macrantha, Klotz	,,	311	axillaris, Korth	" 440
megalantha, D . Don	,,	312	Pellaianthus, Hk. f	v. 786, 809
· · · · · · · · · · · · · · · · · · ·	,,	315	Pellionia, Gaud	▼. 559
mollis, Wall	,,	309	acaulis, Hk. f	" 562
	,,	306	ambigua, Wedd	" 560
	,,	306	bulbifera, Hk. f	" 560
	,,	317	burmanica, Hk. f	, 561
		317		Du-
		307	vauana) N. E. Br.	" 560
TO 4	• • •	315	frutescens, Bl	,, 560
tutu Dana	,,	313	Griffithiana, Wedd	" F:O
	,,	310	Helferiana, Wedd	. " 561
	,,	306	heteroleha Wedd	, E50
	,,		heteroloba, Wedd	" EQ1
	••• ,,	314	Heyneana, Wedd	,, EG1
	,,	314	javanica, Wedd	*** ,,
	• • • • • • • • • • • • • • • • • • • •	306	lævigata, Bl	" 562
	,,	316	procridifolia, Kurz	,, 562
	79	313	stenocarpa, Wedd	,, 560
Stevenii, Bunge	,,	309	Peltandra flexuosa, Thw.	v. 287
	,,	307	longipes, Wight	,, 287
tenuirostris, Benth	,.	307	parvifolia, Wight	,, 287
trichoglossa, $Hk.f$,,	310	Peltanthera solanacea, Ro	th iii. 650
A-1:0 70:1	,,	314	Peltophorum, Vogel	ii. 257
41.16	,,	314	dasyrachis, Kurz	,, 257
	,,	316	ferrugineum, Benth.	" 257
	,,	316	Peltophorus, Desv	vii. 154
	. ,,	309	Myurus, Desv	,, 154
		315	Pemphis, Forst	ii. 572
1. ! D .71		317	acidula, Forst	579
sp., Hk. f. & T. iv. 300	300	310	angustifolia, Roxb	,, E79
311, 312, 313, 31	5 216	317	Penicillaria alopecuroides	
				vii. 82, 85
sp., Strach. & Winterb.		211		
Pedilanthus tithymaloides,		900	ciliaris, Ham	90
T 717 114 T1	▼.	239	ciliata, Willd	
, 53	▼.	727	cylindrica, R. & S	vii. 82, 84
secundum, Bl	;,	730	fallar, Fig. & Not	vii. 82
	i.	486	involucrata, Schult.	
Harmala, Linn	,,	486	nigritarum, Schlocht.	" 82
Pegia ! Colebrookiana, Wig	ht ii.	40	Plukeneti, Link	,, 82
nitida, Coleb	,,	28	Radaiana, Fig. & Not.	,, 82
Pelargonium grossularioid	es i.	435	Rozburghii, A. Br. & Bo	uché " 82
Peliosanthes, Andr	v i.	265	Sieberiana, Schlecht.	,, 82
albida Dalian	,,	267	solitaria, Stokes	,, 82
D-1: 111. f	,,	267	spicata, Willd	,, 82
7-4- XX7-17	,,	266	typhoidea, Fig. & Not.	,, 82
	,,	266	sp., Wall	,, 82
O-10041-11 D-1	•••	266	Pennisetum, Pers	vii. 82
h	• • • • • • • • • • • • • • • • • • • •	266	alopecuroides, Spreng.	
Laure III a Dalana	••• ,,	267	Alopeouros, Steud	vil. 84
	,,	266	amoenum, A. Rich	
longifolia, Steud	,,	266	arangoum Edge	
macrophylla, Wall.	"	266	araneosum, Edgew	vii. 00, 00
neilgherriensis, Wight	,,	400	asperifolium, Kunth	vii. 86

Th					•		•
Pennisetum_	•	Vol.	Page ,	Pennisetum	-	Vol.	Page
aureum, Dalz. & Gibs.	•••	vii.	84	phalaroides, Schult.		٧ıi.	85
barbatum, Schult	• • •	,,	87	plumosum, Hochst		,,	284
borbonjoum, Kunth	•••	,,	88	polystachyum, Schult.		,,	. 87
breve, Nees		,,	87	Prieurii, Kunth	• • • •		89
comphysides Dist		,,	88	opurpurascens, H. B. K.	•••		87
cereale, Trin		٠,	82	respiciens, A. Rich	•••		80
chinense, Steud	•••	"	85	Richardi, Kunth			87
ciliare, Ham		,,	87	rufescens, Spreng			88
ciliare, Link			88	Ruppellii, Steud			86
ciliatum, Parl		"	87	sericeum, Munro	•••		84
compressum, Br		,,	85	1911	. •••	"	87
Cornucopiæ, Heyne	•••	"	300	07-1-m/ 1/1	•••		87
	•	,,	82		•••	•	86
cynosuroides, Wall	•••	"	85		•••	"	82
dasystachyum, Desv.	•••	"	87	175 - 4 3-7 -	. • • •		86
dicnotomum, Delile	•••	"	85	tenue, Fig. & Not tenuispiculatum, Stoud.	•••		87
31-4-1	•••	, •	88				86
distylum, Guss	•••	"	-	tiberiadis, Boiss	•••		
elatum, Hochst	•••	,,	86	triflorum, Nees	•••		86 87
elegans, Nees	•••	"	87	triticoides, R. & S	•••	"	
fasciculatum, Trin	•••	"	86	typhoideum, Rich	•••	"	82
flaccidum, Griseb	•••	"	84	uniflorum, H. B. K	•••	٠,	87
flavescens, Presi	•••	,,	87	? Vahlii, Kunth	•••	,,	83
giganteum, Tenore	•••	"	82	variabile, Fig. & Not.	•••	*1	86
glaucum, Br	•••	"	79	verticillatum, Br	•••	"	80
gracile, Benth	•••	,,	87	violaceum, Hort	•••	"	87
Griffithii, Munro	•••	,,	86	violaceum, Rich	•••	77	82
helvolum, Br	••	,,	79	viride, Br	•••		81
hirsutum, Nees	•••	17	87	sp., Wall			7, 88
Hohenackeri, Hochet.	•••	"	84	Pentabothra, Hk. f	•••	ì₹.	18
holcoides, Schult	•••	"	87	nana, Hk . f	•••	- 7	19
hordeiforme, Spreng.	•••	,,	85	Pentace, Hassk	•••		381
imberbe, Edgew	•••	"	86	burmannica, Kurz	•••	,,	381
implicatum, Steud	•••	**	87	triptera, Mast	•••		382
incomptum, Nees	•••	,,	88	Pentacme siamensis, Kurz			304
intertextum, Ham	•••	"	87		. :::		304
intertextum, Schlecht.	•••	"	87	Pentaglottis suberifolia, W			000
japonicum, Trin	•••	. "	83	vide Pentapetes			369
lanatum, Klotz	Vi		4, 89	•	nta.		080
lanatum, Ham	•••	٧i	i. 87	petes tomentosa			373
lanuginosum, Edgew.	•••	"	59	Pentaloba? bengalensis, W		i.	186
lanuginosum, Hochst.	•••	,,	87	lanceolata, Wall	• • •	11	188
Linnaei, Kunth	•••	,,	82	macrophylla, Wall	•••		187
macrochætum, Jacq.	•••	,,	78	Rowburghii, Wall	•••		186
macrostachyum, Fresen.	• • • •	,,	86	zeylanica, Arn		.",	187
megastachyum, Steud.		,,	82	Pentanema radiatum, Bo			
mongolicum, Franch.	•••	,,	84	Pentanura, Bl	•••	ì⊽.	4
Myurus, Parl	•••	,,	87	khasiana, Kurz	•••		4
nepalense, Griseb	•••	,,	84	sp., Benth	•••	• •	4
nepalense, Spreng	•••	,,	89	Pentapanax, Seem	•••		723
nigricans, Trin	•••	"	85	Leschenaultii, Seem.	•••		724
orientale, Rich	•••	,,	86	Leschenaultii, Seem.	•••		725
pallidum, Nees	•••	"	87	parasiticum, Seem	•••		724
parviflorum, Trin	•••	,,	86	racemosum, Seem	•••		724
pedicellatum, Trin.	••	,,	86	subcordatum, Seem.	• •		724
persicum, Boiss. & Büh	80	"	86	umbellatum, Seem	••	•	725
petreum, Stend	•••	"	88	Pentapetes, Linn	•••		371
phalariforme. Steud.			86	acerifolia, Cav		. ,,	368

Pentapetes	Vol.	Page	Peperomia.	Vol.	Page
phœnices, Linn		371	reflexa, A. Dietr	_	99
suberifolia, Linn. lapsu			Thomsoni, Hk. f		97
Pentaglottis i.	367	36 9	Thwaitesii, Cas. DC	•	98
tomentosa, Wall. vide	00,	, 000	Wightiana, Miq		98
Th A 7 . A A 2 (i.	813	? Wightiana, Cas. DC		98
Pentaphragma, Wall			? Wightiana, Wight	• • •	98
1 - 1A.31 37777	****	437	sp., Hk. f. & T		97
Pentaptera angustifolia, Roxb.	ii.	447	Peplidium, Delile		287
		447	1 ° ' 10 1.1		287
Arjuna, Roxb	"	449		• •	566
bialata, Roxb	"	448		iii.	437
coriacea, Roxb	"	418			437
crenulata, Roxb	"	447	Carnosa, Hk. f. & T		105
glabra, Roxb	"	448	Peraphora robusta, Miers		100
macrocarpa, Wall	"		Perdicium semiflosculare,	iii.	391
paniculata, Roxb	"	448	Ham		388
pyrifolia, Presl	"	448	triflorum, Hum	•	99
pyrifolia, Wall	"	453	Pereiria medica, Lindl		
Romburghii, Tul	"	452		. iv.	37
Saja, Wall	"	448	Calesiana, Hum		37
tomentosa, Roxb	"	447	coromandeliana, Done		38
undulata, Wall	. ??	455	crocea, Zipp		36
Pentapterygium, Klotz	111.	449	evilis, Spreng		44
flavum, Hk. f	"	450	glabra, Linn		651
Hookeri, Clarke	"	450	minor, Andr	. iv.	38
Listeri, King	"	450	minor, Rozb	. ,,	38
rugosum, Hk . f	"	450	montana, Done	. ,,	38
serpens, Klotz	, ,,	449	odoratissima, Sm	. ,,	38
Pentapyxis, $Hk. f.$	iii.	17	odoratissima, Wight	. ,,	38
stipulata, $Hk. f.$	"	17	pallids, W. & A	. ,,	33
sp., Hk. f	"	1,6	parviftora, Bl	. ,,	34
Pentasacme, Wall	iv.	28	puberula, Miq	. ,,	38
caudatum, Wall	"	28	tinctoria, Spreng	. ,,	34
Wallichii, Wight	"	28	Periandra cæspitosa, Camb.	i.	243
Pentaspadon, Hk. f	ii.	28	Pericampylus, Miers	i.	102
? velutinus, Hk. f	"	28	aduncus, Miers	. ,,	102
Pentatropis, Br	iv.	19	assamicus, Miers	. ,,	102
microphylla, W. & A	,,	20	incanus, Miers		102
microphylla, Wall	"	19	membranaceus, Miers	. ,,	102
spiralis, Done	,,	19	Pericopsis, Thw	. iı.	252
Pentsteira lapsu Peristeira	Į٧.	277	Mooniana, Thw	. ,,	252
dichotoma, Griff	,,	278	Perilla, Linn		646
? grandiflora, Griff	"	277	elata, D. Don iv	. 644,	646
paniculata, Griff	"	279	fruticosa, D. Don ,,	643,	646
racemosa, Griff	"	278	leptostachya, D. Don		644
Peperomia, Ruis & Pav	₹.	96	macrostachya, Benth	. ,,	646
Candolleana, Miq	,,	98	ocimoides, Linn		646
ceylanica, Miq	"	98	polystachya, D. Don		646
confusa, Hk. f	"	98	Periplexis rigida, Wall		337
courtallensis, Miq	"	98	sp., Wall		337
courtallensis, Thw	"	98	Periploca, Linn	• • • •	11
dindigulensis, Miq	"	98	aphylla, Done		12
exigna, Miq		97	calophylla, Falc		12
Heyneans, Miq	"	99	emetica, Rotz		13
Heyneana, Wight		98	esculenta, Linn. f		17
moulmeiniana, Cas. DC	. 27	97	hydaspidis, Falc		12
portulacoides, A. Distr	"	98	indica, Willd		-5
pseudo-rhombes, Cas. DC.	"	97	khasiana, Beuth	• • • • • • • • • • • • • • • • • • • •	4
P	"			"	_

· ·				•		•
Periploca	Vol.	Page	Perotis		Vol.	Page
reticulata, Roth		26	hordeiformis, Nees		vii.	
sylvestris, Willd		29	latifolia, Ait		,,	98
tunicata, Herb. Madr	• • •	24	laxifolia, Beauv		"	98
tunicata, Betz	•••	23	longiflora, Nees			98
		1, 4		•••	"	98
		1, 2		• • •	"	71
Peripterygium quinquelobum		597	polystachya, Hb. Heyne	••	**	141
Hassk			polystachya, Willd	• • •	"	
? Peristeira vide Pentsteira			rara, Br	• • •	,,	98
	iv.	554	scabra, Willd		,,	98
acuminata, Nees	* **	555	spicaeformis, Beauv.	•••	, "	98
bicaly culata, Nees	"	554	Perowskia, Karel	•••	ìv.	652
Blumeana, Nees	,,	555	abrotanoides, Karel.		,,	652
dichotoma, Hassk	,,	54 3	atriplicifolia, Benth.		٠,	653
fera, Clarke		556	Persea grandis, Nees incrassata, Nees	v.	143	146
fera, Clarke gracilis, Nees		555	incrassata, Nees		v.	
grandiflora, Parish	"	556	lucida, Bl. vide Phoebe		٠,	143
jalappæfolia, Nees		557	peduncularis, Nees		,,	144
Kotschyana, Nees	"	554	Pseudo-sassafras, Zoll.			136
	"	555			••	128
	, ;; ;; ,;	_	Tamala, Spreng	• • •	", V.	116
	552,		PERSEACE	•••		
pubigera, Nees	iv.	536				313
rivinoides, Wall	,,	555	vulgaris, Mill	•••	,,	313
speciosa, Nees	"	556	Persicaria virginiana. Gae			31
tinctoria, Nees	"	556	Pestalozzia laxa, Thw	• • •	11.	633
tinctoria, Nees	17	556	pedata, Zoll. & Mor.		. 11	638
undulata, Nees	,,	555	Petalidium, Nees		iv.	416
sp., Griff		556	barlerioides, Necs		,,	416
Peristylus aristatus, Lindl.	vi.	158	patulum, Dalz. & Gibs.		,,	412
aristatus, Thw		158	Petaloma alternifolia, Rox		ii.	452
brachyphyllus, A. Rich		159	Petilium imperiale, J. St. 1	fil.		354
1		159	Petrocarya dillenifolia, Ste	nd.	ii.	312
1.7 T ! 21		163	excelsa, Jack	ii	309.	
Y ! 31	"	161	sumatrana, Jack	•••	ii.	309
		162			•••	000
elatus, Dalz		158	Petrosciadium cæspitosum		ii.	689
exilis, Wight	"		Edgew			
fallax, Lindl	"	129	Petunga, DC	100		711
goodyeroides, Lindl	"	161	longifolia, DC iii.	120	', IV.	190
gracilis, Bl grandis, Bl	,,	157	microcarpa, DC Roxburghii, DC	•••	111.	120
	,,	161	Roxburghii, DC	• • •	"	120
Hamiltonianus, Lindl	,,	160	variabilis, Hassk	•••	"	120
lancifolius, A. Rich	"	160	venuloss, Hk. f	•••		121
Lawii, Wight	,,	162	PEUCEDANE			670
Parishii, Robb. f	,,	162	Peucedanum, Linn		ıi.	
persimilis, Wight	,,	160	anamaliayense, Clarke		,,	710
plantagineus, Lindl	**	162	ceylanicum, Gardu.		,,	710
Richardianus, Wight		156	Dhana. Ham		,,	709
robustior, Wight	"	160	dissectum, DC		••	701
		159	glaucum, DC		7Ö9.	710
Pernettya repens, Zoll	iii.	457			ii.	
Description seemeds Descri			glaucum, Wall			700
Perotachne secunda, Presl	iv.	599				710
			grande, Clarke graveolens, Benth	•••		709
canescens, Jack		599	graveoreus, nemil	•••	"	709
heterophyllum, Miq.lapsu C.	"	599	ramossisimum, Wall.	•••	,,	710
Perotis, Ait	vii.	98	sikkimense, Clarke	•••		
Burmanni, Steud	12	98	? skardicum, Clarke			711
cubana, Wright	"	98	Sowa, Kurz		,,	709
cubana, Wright glabrata, Stend	"	98	Thomsoni, Clarke		,,	711
-						

Peucedanum	Vol.	Page	Phalænopsis	7	ol. I	Page
Wallichianum, DC	**	700	Kunstleri, Hk. f	•••		30
sp., Hk. f. & T	"	711	Lowii, Rchb. f		,,	3 0
Phaca astragalina, DC		124	Mannii, Rohb. f	:	"	30
cachemerica, Benth	,,	126	Parishii, Rchb. f	•••	"	31
frigida, Linn	,,	189	speciosa, Rchb. f.	•••	"	30
Hoffmeisteri, Klotz		121	tetraspis, Rchb. f		,,	30
lapponica, DC	,,	137	violacea, Teysm. & Bu	an.	"	29
longicaulis, Benth	,,	126	Wightii, Rehb. f		,,	32
Vogelii, Webb	,,	121	P halangium Ad en anthera	,Poir.	vi.	337
Phacellaria, Benth	₹.	235	alatum, Ham	• • •	,,	333
compressa, Benth	,,	235	alatum, Wall	•••	,,	334
rigidula, Benth	"	235	attenuatum. Wight	•••	,,	335
Wattii, Hk. f		236	falcatum, Wall	•••	"	336
Phacelurus, Griseb	vii.	152	indicum, Kunth	• • •	,,	335
Phacordylis areolata, Griff.	٧.	239	nepalense, Lindl		,,	335
Phesanthus, Hk. f. & T	i.	72	'niveum, Poir		,,	336
malabarious, $Bedd.$,,	72	oligospermum, Wight	·	,,	336
nutans, Hk. f. & T		72	ornithogaloides, Schwe	inf.	,,	334
Pheecasium, Cass	iii.	398	? parviflorum, Wight	•••	,,	336
lampsanoides, Cass	,,,	398	tuberosum, Dalz. & Gil)8.	,,	335
_pulchrum, Rohb	"	398	tuberosum, Wight		,,	334
Phaenopus (Phenopus) orien-	•		PHALARIDE #		. б,	
talis, Boiss :	iii.	404	Phalaris, Linn	•••	vii.	220
Phæocordylis areolata, Griff.	٧.	239	ambigua, Fig. & Notar		,,	221
Phagnalon, Cass	iii.		americana, Ell	•••	,,	221 .
acuminatum, Boiss		288	aquatica, Ait	• • •	"	221
denticulatum, Clarke	,,	28 8	arenaria, Willd		,,	237
\mathbf{niveum} , $Edgew$,,,	288	arundinacea, Linn.	•••	,,	221
Phajus, Lour v. 81	▼.	816	aspera, Retz	•••	"	237
albus, Lindl v. 81	8, vi.	. 192	bulbosa, Desf		37	221
australis, F. Muell	vi.	191	canariensis, Linn	•••	**	22 0
Bensoniæ, Henisl	22	192	canariensis, Wall	•••	,,	221
bicolor, Lindl		816	capensis, Thunb	•••	,,	221
bicolor, Veitch	vi.		colorata, Beauv	•••	,,	221
? Blumei, Lindl callosus, Lindl	¥.	816	cristata, Forsk	•••	"	245
	"	817	hispida, Thunb	•••	,,	146
Carronii, F. Muell	٧i.		intermedia, Bosc	•••	,,	221
	₹.	818	minor, Retz	•••	,,	221
	"	816	muricata, Forsk	•••	,,	97
grandifolius, Lour	, ,,	816	nepalensis, Trin	•••	,,	2 21
grandifolius, Veitch	vi.		oryzoides, Linn	•••	,,	91
leucophæus, F. Muell	• ••	191	paniculata, Ait	•••	,,	287
luridus, Thw	_ ₹.	817	paradoxa, Linn. f		"	220
maculatus, Lindl. v. 81		. 192	pectinata, Roth	•••	,,	221
Marshallianus, Rohb. f. vic	ie	~14	picta, Hort	•••	,,	221
Thunia	▼.	818	setacea, Forsk	•••	,,	85
mishmensis, Rchb. f	, ,,	817	vaginiflora, Forsk	•••	,,	285
mishmensis, Rchb. f nanus, Hk. f veratrifolius, Lindl. v. 81	. vi•	192	velutina, Forsk	•••	. >>	14
veratrifolius, Lindl. v. 81	o, vi	. 191	zizanioides, Linn		,,	186
Wallichii, Lindl. ▼. 81	o, v i.	TAI	Phaleria, Jack		v.	199
Phakellanthus multiflorus, Zo	II. Vi	. 676	cauliflora, Benth	•••	"	199
Phalænopsis, Bl	1. 29,	, 178	PHALERIES		v.	192
amabilis, Bl	▼í.	29	Phanera Blancoi, Benth		ii.	278
	, ,,	81	bidentata, Beath	•••	"	279
Cornu-cervi, Par. & Rchb.	j. "	29	bracteata, Benth		,,	282
Esmeralda, Rchb. f	,,,	81	diphylla, Benth	•••	,,	278
fuscata, Rchb. f	"	31	diptera, Miq	•••	"	285

Phanera		Wal	Dago	Phaseolus	•	V ∩I	Page
elongata, Benth		ii.	Page 281	compressus, DC		ii.	200
excelsa, Bl		,,	283	cornutus, Bl		,,	202
ferruginen, Benth		"	283	decurrens, Grah)))),	196
Finlaysoniana, Benth		"	278	difformis, Wall	•••	"	207
glabrifolia, Benth		"	281	clichoides, Roxb		"	206
ylauca, Benth		»	233	farinosus, Linn	•••	"	203
Griffithiana, Benth.	•••	"	283	fuscus, Wall		,,	204
integrifolia, Benth		"	279	fusiformis, Grah		"	206
lucida, Benth		"	278	glaber, Roxb		,,	203
macrostachya, Benth,		"	282	glabrescens, Steud		"	203
nervosa, Benth		"	283	gonospermus, DC		"	200
phænicea, Benth		,,	283	Grahamianus, W. & A.		,,	201
purpurea, Benth		"	284	grandis, Da/z. & Gibs.		"	202
retusa, Benth		"	279	grandis, Wall		,,	204
rufa, Benth		,,	280	hæmatocarpus, DC		"	200
semibifida, Benth		,,	280	hirtus, Retz		"	203
Vahlii, Bersh		11	279	hirtus, Wall		"	203
variegata, Benth		,,	284	inamænus, Lipu	• • •	,,	200
velutina, Benth		,,	280	lucens, Wall	•••	,,	207
sp., Benth		"	285	lunatus, Linn	• • •	"	200
Pharbitis, Chois		i▼.	199	Max, Roxb	• • •	,,	203
barbata, G. Don		,,	199	multiflorus, Willd	• • •	,,	200
barbigera, G. Don		,,	193	Mungo, Linn	•••	"	203
diversifolia, Lindl		"	199	Mungo, Wall	•••	"	203
hederacea, Chois		**	199	nanus, Linn	•••	"	200
laciniata, Dalz		"	200	oblongus, DC	• • •	"	200
Nil, Chois		"	199	obovatus, Grah	•••	"	205 202
punctata, G. Don		**	199	pauciflorus, Dalz	•••	"	202
		"	199	psoraleoides, W. & A.	•••	"	200
_variifolia, Done		,,,	199	puberulus, H. B. K.	•••	"	203
Pharnaceum Cerviana,	Linn.		663	pubescens, Bl	•••	**	206
		1.	245	pulniensis, Wight	•••	"	203
		ij,	663	radiatus, Linn	•••	,,	205
		**	662	repens, Grah	•••	**	203
		"	664	Roxburghii, W. & A.	•••	"	200
parviflorum, Roth		**	662	rostratus, Wall	•••	**	200
pentagonum, Roxb		"	662	saponaceus, DC	•••	"	201
pentaphyllum, Spren		"	663 cas	semierectus, Linn senegalensis, Guill. & Pe	rr	"	200
spathulatum, Spreng		"	664 663	sepiarius, Dalz		"	206
strictum, Spreng		"	663	setulosus, Dalz		"	203
triphyllum, Spreng.	•••	y)	95	sphæricus, DC		"	200
Pharus aristatus, Retz.		V 11.	94	sublobatus, Wall		202,	203
ciliatus, Retz		"	95	subvolubilis, Ham		ii.	203
7 4 10	•• •••	"	95	tenuicaulis, Baker		1)	201
The second of the second of t		"	58	torosus, Roxb		"	204
		,,	200	trilobus, Ait		"	201
aconitifolius, Jacq			202	trilobus, Wall		"	202
adenanthus, G. F. M		"	200	trinervius, Heyne		"	203
1 / D			200	truxillensis, H. B. K.		"	200
. n 1			200	tumidus, DC		"	200
angustifolius, Wall	•		206	tunkinensis, Lour	•••	"	200
* ++ '	•• •••		203	velutinus, Grah	•••	,,	204
			203	vexillatus, Linn	•••	,,	206
			219	vulgaris, Linn	•••	"	200
cirrhosus, H. B. K			200	vulgaris, Wall	•••	"	200
coccineus, Lam			200	Wightianus, Grah	•••	"	203
•							

Phaseolus	Vol.	Page	Phleum	Vol.	Page
Wightii, W. & A		203			237
Xuaresti, Zucc		200	ovatum, Jacquem		287
Phaylopsis, Willd	•	416	paniculatum, Huds '		237
parviflora, Willd		417	pratense, Linn		236
Phelipæa ægyptiaca, Boiss.	iv.	*326	ramosum, Gilib		237
ægyptiaca, Hk. f. & T		327	schæniodes, Linn		236
Calotropidis, Walp		324	ventricosum, Monch		2 37
cytinoides, Reuter		323			237
indica, G. Don		326	viride, All Phlogacanthus, Nees	• .	510
ramosa, C. A. Meyer		327	albiflorus, Bedd		515
subacaulis, Benth		321	37		512
tubulosa, Schrenk		324	asperulus, Wall		511
Phellandrium stoloniferum		041	curviflorus, Nees		511
	• ••	696	cymosus, Kurz		514
		682	elongatus, T. Anders		513
sp., Wall		580	grandis, Bedd		515
					512
Sonneratii, Wedd V	r. 477	, 500			514
Phenopus (vide Phaenopus	•	523		• • •	513
Phialacanthus, Benth		523	Jenkinsii, Clarke		510
Griffithii, Benth			latifolius, Wight		512
Philadelphus, Linn	. ii.	407	parviflorus, T. Anders	"	513
coronarius, Linn		407	pubinervius, T. Anders	"	514
corymbosus, Wall		406	pulcherrimus, T. Anders thyrsiflorus, Nees	"	512
nepalensis, Loud	,,	407			511
tomentosus, Wall		407	tubiflorus, Nees		512
triflorus, Wall		407	vitellinus, T. Anders		
Philagonia framinifolia, Hool	. i.	490	Walliohii, Clarke	"	511
procera, DC sambucina, Bl	. ,,	490	sp., Hk. f. & T	."	513
	• .!!	490	Phlomis, Linn		691
	. iii.	613	alba, Blanco	"	672
paniculata, Roxb	. ,,	615	aspera, Willd	* >>	690
ramistora, Roxb	. ,,	611	tiflora, Roxb	",	683
robusta. Roxb	. ,,	614	bistora, Vahl	"	683
terminalis, Roxb		615	bracteosa, Royle	"	693
PHILODENDREE	: v i.	491	breviflora, Benth	"	693
Philodendron? peregrinum	,		calycina, Roxb	"	679
Kunth	. vi.	526	cashmeriana, Royle	"	692
PHILYDRACEAE	. vi.	363	Cephalotes, Roth	17	689
Philydrum, Banks	. v i.	363	chinensis, Retz	"	681
lanuginosum, Banks	. ,,	363	cordata, Royle	"	693
Phippsia, Br vii.	. 240,	421	diffusa, Herb. Rottl	"	689
algida, R. Br "	240,	310	eriostoma, Heyne	17	686
himalaica, Hk. f ,	240,	311	esculenta, Roxb	"	690
Phlebocalymna, Griff	i.	589.	hirta, Heyne	"	687
Griffithiana, Mast	. ,,	590	lamiifolia, Royle	30	693
Lobbiana, Mast	• 11	590	latifolia, Royle	,,	69 8
Phlebochiton extensum, Wall	. iï.	28	linifolia, Roth	,,	691
Phlebophyllum angustifo-			macrophylla, Wall	"	692
lium, Benth	. iv.	434	montana, Roth	,,	682
Kunthianum, Nees		484	nepetæfolia, Linn	"	691
Phleum, Linn	. vii.	236	nutans, Roth	"	688
alpinum, Linn		236	obliqua. Ham	"	690
arenarium, Linn		237	oreophila, Kar. & Kir	"	692
-	. ,,	237	parviflora, Benth	,,	693
crinitum, Schrob	• • • • • • • • • • • • • • • • • • • •	245	Plukenetii, Roth	,,	690
Hænkeanum, Presi		236	rotata, Benth	"	694
monspeliense, Koel.	• • • • • • • • • • • • • • • • • • • •	245	rugosa, Benth	"	693
	• ,,			.,	

,	UNDDAT	INDEX	705
`	ENERAL	INDEX.	725
Phlomis vo	l. Page	Phonix	Vol. Page
setigera, Falc i		paludosa, Roxb	vi. 427
	, 693	pedunculata, Griff	,, 427
	, 692	pusilla, Gaertn	,, 425
Stewartii, $Hk. f.$, 692	pusilla, Lour	,, 427
	, 688	Pousilla, Trim. •	,, 426
	, 6 80	robusta, $Hk. f.$,, 427
	, 689	Rosbelinii, O'Brien	,, 427
	, 691	rupicola, T. Anders.	,, 425
	. 191	siamensis, Miq	, 427
	, 191	sylvestris, Roxb sylvestris, Thw	,, 425
Haalaniamaa Mhoo	, 191		,, 425
Zamano Zatava VIII Pa A	, 191 , 191		,, 427
magananhailla W & A	100	and make II and	492
D1 1 11 D	100	Phoeniropus, Cass	iii. 403
Donkunghii Ronn	100	TDL = 12.4 = = = = = = = = = = = = = = = = = = =	400
TET : 7.1: 6\TT 0- A	101	D 71 N.C.	490
	7. 141	macrocarpa, Becc	" 49 0
amountifolia Maissa	, 141	Pholidota, Lindl	v. 844
attanmata Masa	, 143	advena, Rchb. f	, 846
madamanada Min	, 143	articulata, Lindl	,, 844
declinata, Nees	142	calceata, Rchb. f	,, 846
	2, 910	carnea, Lindl	" 847
	12, 910	Convallariæ, Hk. f	, 846
	. 140	Griffithii, Hk. f	,, 845
Innecolete Meso	, 141	imbricata, Lindi	,, 845
1-Aifalin Obomm	, 136	khasiana, Rohb. f	,, 844
ligustrina, Nees	, 142		847, vi. 195
	, 143	obovata, Hk.f	v. 845
	, 143	pallida, Lindl	, 846
	, 135	parviflora, Hk. f	vi. 195
opaca, Bl ,	, 143	protracts, Hk. f	v. 845
pallida, Nees	, 142	recurva, Lindl	, 814
	6, 142	rubra, Lindl	200
•	7. 142 . 139	suaveolens, Lindl undulata, Lindl	,, O.45
	149	undulata, Lindl Photinia, Lindl	,, 847
9 hallidana Mana	145	? arguta, Wall	ii. 379, 382
millong Winh	140	Blumei, Done	ii. 380
Wightii Maisan	149	? dubra, Lindl	, 371
	204	dubia, Wall	,, 371
73	, 206	dubia, Wenzig	,, 371
annin ann Min	, 206	eugenifolia, Lindl	,, 381
	, 206	Griffithii, Dene	,, 381
PHENICEÆ v		integrifolia, Lingl	" 381
Phænicoidea, Griff v	i. 425	integrifolia, Miq	,, 391
	i. 424	Lindleyana, W. \mathcal{S} A.	,, 380
a aamilia. Ilaun	, 426	longifolia, Done	,, 370
acaulis, Mig	, 427	micrantha, Done	, 381
Andersoni, Hort. Calc	, 425	mollis, Hk. f	,, 381
cycadifolia, Regel ,	, 428	Notoniana, W. & A.	,, 380
dactylifera, Linn ,		Notoniana, Wall	, 380
farinifera, Roxb		polyneura, King	,, 377
humilis, Royle		serrulata, Lindl	071
	, 427	subsessilis, King Phragmites, Trin	,, 371 rii. 303, 421
	, 427 , 427	bifaria, Wight	vii. 304
Ouseleyana, Griff	, 221	organia, might	601

Phragmites	Vol.	Page	Phyllanthus	Vel	Page
chilensis, Steud		. 303	anabaptizatus, Muell.	₹.	
cincta, Clarke		305	anceps, Heyne	v. 293	
communis, Trin	• • •	303	anceps, Hb. Madr	V.	285
? Emodi, Arn. & Nees		303	Andersonii, Muell		320
Linear Lan Manna		303	andrachnoides, Willd.	,,	293
1 37 37 4		303		*** "	305
2.2. n - 10 - 1.1.	•••	304	3611	,,	316
TZ Are Marker		804	1 76 .77	,,	327
1		303	36.31	••• ,,	320
manulandan Kanth	• • • • • • • • • • • • • • • • • • • •	303		,,	335
a amalamaia Maan	•••	304	bacciformis, Ham	,,	299
	•	304	bacciformis, Hb. Madr.	,,	285 285
Darlamak !! Okamil	••	304 304	bacciformis, Linn	,,	291
	•••	304	bacobotryoides, Wall.	*** ,,	
vulgaris, Trin	•••		Baillonianus, Muell.	,,	300
Zollingeri, Steud		305	bicolor, Muell	,,	32 3
Phreatia, Lindl		810	brachylobus, Muell	,,	313
elegans, Lindl		810 -	brevipes, Hk . f	*** ,,	297
minutiflora, Lindl		811	canaranus, Muell	••• ,,	311
Myosurus, Lindl		810	cantonienses, Hornem.	,,	293
Myosurus, Rohb. f	. ".	810	cernuus, Ham	,,	330
nana, $Hk.f.$ v. 81	•		Chamissonis, Klotz	,,	288
parvula, Benth	. ▼.	811	Cheremila, Roxb	,,	304
perpusilla, Benth	, ,,	811	Cicca, Muell	,,	304
uniflora, Wight		788	cinerascens, Wall	,,	331
Poryma, Linn	iv.	561	cinereus, Muell	;,	303
leptostachya, Linn		562	Clarkei, Hk. f	',,	297
PHRYMEA:	iv.	560	coccineus, Muell	,,	308
Phrynium, Willd	vi.	258	columnaris, Muell	,,	291
Cadellianum, King	, ,,	26 0	cordifolius, Wall	,,	284
capitatum, Willd	,,,	258	coriaceus, Wall	,,	292
dichotomum, Korn	,,,	259	cyanospermus, Muell.	,,	305
dichotomum, Boxb	,,,	258	dalbergioides, Wall.	,,	288
Griffithii, Baker	,,	260	Daltoni, Muell	,,	320
imbricatum, Rowb		259	debilis, Ham	,,	299
macrostachyum, Wall		259	debilis, Wight	,,	296
musaceum, Wall		259	depressus, Russell	v. 295,	296
parviflorum, Roab		259	distichus, Muell	v.	804
		259	diversifolius, Miq	,,	321
spicatum, Rosb spicatum, Griff		260	echinatus, Ham	,,	293
sumatranum, Miq		260	elegans, Wall	,,	300
virgatum, Roxb	•••	258	Emblica, Linn	••• ,,	289
zeylanicum, Benth		260	Emblica, Wall	*** ,,	290
Phtheirospermum, Bunge iv		.734	emblicoides, Muell	,,	290
glandulosum, Benth		304	fagifolius, Muell	••• ,,	817
Parishii, Hk. f		304	fimbriatus, Muell	,,	802
Phyla chinensis, Lour	• • • •	563	flaccidus, Thw		293
Phyllagathis, Bl	••	541	flueggeiformis, Maell.	•	289
rotundifolia, Bl		541	frondosus, Wall	••	292
Phyllamphora mirabilis, Lour	. v.	69	fruticosus, Heyne	"	296
PHYLLANTHER	_	240	Gardneri, Thw	•	295
Phyllanthus, Linn		285	Gardnerianus, Baill.	,,	295
acutus, Wall	• •	301	glaucifolius, Wall	v. 322,	
acutus, Wall	"	292	glaucogynus, Muell		825
affinis, Muell	"	304	glauous, Wall		288
alatus, Bl	"	293	7 777-12	,, v. 284,	
albicans, Wall	"	329			289
-11-1	"	289			301
aldizzoides, Hk. J	99	-00	gomphocarpus, $Hk. f.$	***))	OUT

				•		
Phyllanthus	37-1	D 1	Phyllanthus	١.	ol, P	
annoilimes March	Vol.		Maniauli Mia			
gracilipes, Muell	. ₹.		Naviruli, Miq	•••		329
Griffithii, Muell	. ,,	294	neilgherrensis, Muell.	• • •	"	316
griseus, Wall ▼. 288	. 289.	328	nemoralis, Muell		"	324
	. v .	345	nemorum, Russell			2 91
					•	322
hakgalensis, Thw	. ,,	291	hepalensis, Much	•••	7.7	
Hamiltonianus, Muell	. ,,	304	nephradenius, Muell.	•••	"	302
Helferi, Muell		312	Niruri, Linn			298
	. 802,		377		293,	299
hirsutus, Muell	. v.	311	nitidus, Muell	•••		311
Hoffmeisteri, Klotz	,,	284	obcordatus, Willd		11	293
	. ,,	314	obliquus, Muell		٠,	311
77 7 37 11		294	obliquus, Wall			303
	. ,,					331
	. ,,	305	oblungifolius, Dennat.		,,	
indicus, Muell	. ,,	305	obscurus, Willd	• • •	,,,	317
. D.	. ,,	293	obtusus, Schrank		"	328
		290	oreophilus, Muell			30 3
	,,	:	0 1 11 34		"	292
	!,_	294		•••	,,,	
	r. 310	, 320	pachyphyllus, Muell.	• • •	,,	292
khasicus, Muell	v.	324	pallidifolius, Muell.		,,	302
Kirganelia, Ham. & Roxl		288	pallidus, Muell	• • •		3.2
Transition, Ham. of Hox.					"	294
	,,	292		•••	,,	296
lævigatus, Muell	,,	319	patens, Miq	• • • •	**	
lanceolarius, Muell	,,	808	patens, Roxb		19	329
7 " (7. 1	,,	290	pectinatus, Hk. f		"	290
		293	Peltandra, Muell.		,,	287
teprocarpus wight	,,		penangensis, Muell			326
	. ,,	325		• • •	;;	298
	,,	296	perdulus, Rozb	• • •	,,	
leucophyllus, Str. & Wint	· ,,	328	pentandrus, Roxb		,,	288
Tanana Vaan		329	Perrottetianus, Muell.		"	316
		293	polyphyllus, Willd		,,	290
2444 24 25 11	,,		r polyphyllus, Dalz. & G			290
	,,	308	porgprigates, buth. to d		**	293
longiflorus, Heyne	,,	302	polyphyllus, Hb. Madr.	••	"	
	,,	301	polyphyllus, Heyne		"	290
3677		287	polyphyllus, Wight		••	298
	•• ,,	298	pomaceus, Moon	•••	,,	329
	37	329	pomiferus, Hk. f			289
	,,			•••	"	294
lucidus, Hort	,,	32 8	prætervisus, Muell	•••	"	
36 1 36 17	,,	296	Prieurianus, Muell	•••	,,	288
's 90 91		301	puberulus, Miq		,,	288
matrices The	•••	287	pubescens, Moon		,,	325
	,,		pubescens, Wall		289.	331
	,,	292				801
malabaricus, Muell.	,,	319	pulcher, Wall	•••	▼.	
'417' 1 4	,,	293	pycnocarpus, Muell.	•••	"	816
	. ,,	296	quadrangularis, Willd.	•••	"	385
marymana, heyho		288	racemosus, Heyne	٧.	290,	293
	,,		racemosus, Linn		₹.	285
	,,	296	Tucenous, Bash			381
Missionis, Hk. f	,,	297	reclinatus, Roxb	•••	"	288
	,,	325	reticulatus, Poir	•••	"	
		298	retusus, Dennst	•••	"	329
		288	retusus, Roxb		"	328
	,,	807	rhamnifolius, Heyne		"	380
multilocularis, Masii.	,,					335
muricatus, Hb. Madr.	,,	298	rhamnoides, Roxb	•••	"	380
	,,	296	rhamnoides, Willd	•••	"	
	,,	288	Rheedii, Wight	•••	"	298
Manager of the state of the sta		885	Rosperianus, Wall		"	294
	,,	318	rotundatus, Wight		,,	328
	39		rotundifolius, Klein		•	299
nanus, Hk. f	17	298	Folunditonius, Aceta	•••	,,,	

Phyllanthus	Vol.	Page	Phyllostachys Vol. 1	Page
rotundifolius, Hb. Madr. V.			bambusoides, Sieb. & Zucc. vii.	386
Roxburghii, Muell		300		386
scabrifolius, Hk. f	. ,,	29 9	megastachya, Steud ,,	386
sepiarius, Roxb:		330	Physalis, Linn iv.	238
sericeus, Muell		52 6		238
sikkimensis, Muell		304		238
silheticus, Muell	-	327		23 9
simplex, Retz	•	295		240
simplex, Roxb		295		23 8
einensis, Muell		288		23 8
sphærogynus, Muell		317		239
spinescens, Wall		288		238
spinulosus, Heyne		290	minima, Linn ,,	238
P stellatus, Retz		320		238
Stocksii, Muell		305		238
strictus, Roxb	•	332		238
suberosus, Wight		287		238
suffultus, Wall		329		238
superbus, Muell		323	Rothiana, R. & S ,,	238
symplocoides, Muell	"	325		239
? taxifolius, D. Don v.	289,			243
tenellus, Wall. v. 297, 299			towner toog Thunh	239
	291,			238
tetrandrus, Wall	^	304		406
Thomsoni, Muell		818	sp., Hk. f. & T ,,	407
Thwaitesianus, Muell	"	287		244
tinctorius, Vahl		331		244
tomentosus, Muell	"	809		244
trinervius, Wall		334		165
tristis, A. Juss		330	brahuicus, Hook ,,	165
turbinatus, Koen	"	329	Chamærapistrum, Boiss "	165
urinatia, Linn	"	293	Physostelma, Wight iv.	62
urinaria, Hb. Russ		298	campanulatum, Done "	62
velutinus, Muell	"	322	Wallichii, Wight ,,	62
rirgatus, Hb. Madr	"	295	Physurus, Rich vi. 94,	179
rirosus, Roxb	• • •	328	Blumei, Lindl vi	94
virosus, Wall	"	288	hirsutus, Lindl ,,	94
virosus, Wight v.	330,		humilis, Bl ,,	94
Vitis-idæa; Roxb	₹.	380	? viridiflorus, Lindl ,,	96
Wallichianus, Muell	"	315		438
Wightianus, Muell	"	303	begonifolium, Roxb ,,	487
Wightianus, Muell	"	328		442
Wightianus, Wall		288		438
	302,	311		591
Zollingeri, Muell	₩.	302		592
Phyllobosa, Benth	•	364		591
amplexicaulis, Benth		364		591
sp., Benth		363		592
Phyllochlamys, Bureau	Ϋ.	488		592
spinosa, Bureau		488		592
Wallichii, King		489		592
Phyllocyclus Helferi, Kurz	iŸ.	106		593
Parishii, Kurz	, ,,	1.05		573
Phyllodes Placentaria, Lour.		259	Phytolacca, Linn v.	21
Phyllodium pulchellum, Desv.		162	acinosa, Rozb ,,	21
		162	decandra, Linn ,,	21
Phyllostachys, Sieb. & Zucc.	vii.	386	Kaempferi, A. Gray ,,	21
injulosacinja, biev. g 22400.	,	200		

V	ol, Page	Piles Vol. P	a.ma
	v. 21		552
	r. 653		561
Wankaskiana Madd	., 655	lancifolia Ul. f	553
Phytosen Corn	,, 653	malastamaidas DI	557
Marinda Link	,, 653	• malantamaidan Allada	557
Namhta Knicht	" 655	missariadelia Wia	553
Pindroun Lond	" REE	mimonhalla Linha	551
Wahhiana Lond	" GKA	maragan Tindl	551
•	i. 517	obliane Ul f	558
	i. 52 0	amaa n 1 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	557
	,, 52 0	hhow when t	555
in-marine Di	520	nachwaanna Wadd	557
mamalamaka Dana	" EOO	pacnycarpa, wear ,, to peduncularis, Sm. vide	,,,
amaggiaidas Dann	" 590 l	TT-sian (557
	ii. 413		557
amianda DČ	419	manlaidas Haak fa Aum	554
	" 419 [555
D::- 7 7	ii. 392		558
1 7 W7-11	900		554
biomodeiden Timm	ິ ອດອ ໄ		554
	" 993		556
	v. 290	amila idalia Titadd	553
V D41	290	atimalana 16ta	555
Kurrooa, Benth	i. 423	0	554
Warman lamin DC	199	Annaidalin Wadd	552
	" 199		557
	" 000	trinervia, Wight ,, 5	556
	979		554
	971		105
	960	milidea Ul C C T	105
	7 971		277
manusificana Manall	" 260	Danah	276
	. 372		383
sapida, Roxb v. 368, 37			625
	ii. 4 6 0	Pilotrichum vide Ptilotri-	
farmana D Dan	461	chum i. i	141
Outmaking Tile A	" 480 l	Pimelandra, A. DC iii.	530
Innecelate D Don	461	? erecta, Clarke ,,	531
	, 460	eugenizefolia, Hk. f ,, f	530
	461		531
	416		531
	r. 551	Wallichii, A. DC " 5	531
	, 555		168
a-ib-lla Wall	" 55 9		168
annonimata (Vanka	, 553		162
han starms 117 and d	555		384
Market III. f	, 553		384
3'8-12- Til- E	, 558	acronemæfolia, Clarke ,,	386
Alamanda Min	, 557		686
Annatorna Tile f	, 558	addoordone, same in in in	689
-1-1 D1	, 553		383
Goglado, Bl	, 553	, out ,	886
Goglado, Wedd	, 556	Cooperation, and the cooperation of	898
	, 558	Candolleana, W. & A "	687
TT 1 TT 3	,, 557	24 14 17 77 7	719
77	, 554		688
3 1 1 13 13 1	, 558	,	687
VOL. VII.		1	

				-		
Pimpinella	•	Vo]. 1		Pinus		I. Page
Heyneana, Wall	• • • • • • • • • • • • • • • • • • • •	ii.	684	Finlaysoniana, Wall.	'*	
Hookeri, Clarke		"	686	Gerardiana, Wall	,	
involucrata, Miq	• • • • • • • • • • • • • • • • • • • •	,,	697	Griffithii, M'Clell	;	, 651
P involucrata, W. & A.		,,	682	Griffithii, Parl	,	, 655
javana, DC		,,	697	Kasya, Kurz	v. 65	1, 652
lateriflora, Dalz. &			689	Keseya, Royle	v	
Leschenaultii, DC		**	687	Khasya, Royle	,	GEO
monoica, Dalz		"	687	khasyana, Griff	,	
'A1 1		"	684			050
		"	688			get
Parishiana, Kurs		31	683	Latteri, Madd	,	GEO.
pubescens, Wall	• •••	"		Latter, Mason	,	
rhodantha, Boiss		"	685	longifolia, Rozb		, 652
Saxifraga, Linn		٠,	685	Merkueii, Jungh	,	
sikkimensis, Clarke		"	685	mitis, Gordon	,	, 651
sikkimensis, Benth		"	699	Naphtah, Antoine	,	, 655
sinica, Hance		"	688	nepalensis, Forbes	,	, 651
Stracheyi, Clarke		"	688	nepalensis, Royle	,	, 651
tenera, Benth		"	686	pendula, Griff		, 651
tomentoss, Dalz		"	689	Peuce, Griseb		, 651
trifoliata, Wall		"	688	Pinaster, Soland		, 651
Wallichii, Clarke		"	685	Pindrow, Royle		. GEZ
	687,	ARR		Royleana, Jameson		DET
		₹.	791	770	-	" QET
Pinalia alba, Ham		vi.	406			" AES
Pinanga, Bl		₩1.		Smithiana, Lamb		. 654
bicolor, Bl. vide bijide		"	408	spectabilis, Lamb		,,
bifida, lapsu bicolor, I	SI:.	17	408	striata, Ham	••• ;	,, 65‡
coronata, Kurz		17	409	sumatrana, Jungh	•••	,, 652
costata, Bl		"	409	Webbiana, Wall	••• ;	,, 654
Dicksonii, <i>Bl.</i>		,,	409	Piper, Linn	1	r. 78
distichs, Bl		"	4 08	acre, Bl ,	• • • •	,, 92
gracilis, Bl		"	407	Amalazo, Linn	;	, 95
Griffithii, Beco		"	407	anisotis, Hk. f		,, 86
hexasticha, Scheff			406	araneum (800 avanum)		"
Hookeriana, Becc	-	"	410	arborescens, Roxb		v. 96
hymenospaths, Hk . f.		"	411	arborescens, Miq		90-
Kuhlii, Bl		"	409	arborescens, Roxb		774
	•	"	410	arborescens, Thw	▼.	·
Manii Pasa		"	409			r. 85
Manii, Becc		33	412	arborescens, Wall		. 96
Nenga, Bl	•	"		arcuatum, Bl		" I .
paradoxa, Scheff	• •••	33	4ll	arcuatum, Thw	▼.	
patuls, Bl	• •••	"	411	argyropyllum, Miq	1	r. 93
pectinata, Becc		"	410	argyrophyllum, Thw.	•••	,, 94
perakensis, Becc		"	410	Arnottianum, Cas. DC.	••• ;	, 84
polymorphs, Becc		"	407	attenuatum, Ham	••• ,	,, 92
robusta, Becc		"	408	attenuatum, Cas. DC.	•••	,, 96
Scortechini, Becc		"	408	aurantiacum, Wall.		, 86
subruminata, Becc		,,	4(18	aurantiacum, Wall		, 92
Pinguicula, Linn		iŸ.	335	auriculatum, Bl		,, 85
alpina, Linn			335	avanum (aransum) W	_77	, 96
handalaha Tad		"	335	baccatum, Cas. DC		, 90
A		"	335	bantamense, Cas. DC.		
130 91		"	65 L			. OE
Pinus, Linn		₹.	654			,, 88 84, 88
Brunoniana, Well		"		himmenium Con DC	_	
decidua, Wall		"	654	birmanicum, Cas. DC.		v. 88
Deodara, Roxb		37	658	boehmeriæfoliava, Wal		, 85
dumosa, D. Don		` ,,	651	brachystachyum, Wall		,, 87.
excelss, Wall		27	651	bracystachyum, Wail.	•••	,, 83

Piper .	Vol.	Page	Piper Vol. Page
callosum, Opis	v.	84	nepalense, Wight v. 94
caninum, Bl	,.	82	nigram Line 00
ceylanicum, Cas. DC.	,,	: 1	nigrum, Wall v. 86, 89, 94, 96
Chaba, Hunter	,	83	nilghirianum, Cas. DC v. 93
Chavya, Ham	,,	85	• ohlonoum Wall oo
Chuvya, Hunter?	,,	87	obtusissimum, Miq ,, 96
clupeatum, Wall	v. 96	, 537	officinanum, Cas. DC , 84
coriaceum, Vahl	v.	96	ovalifolium, Wall v. 97, 98
Cubeba, Miq	,,	96	pachyphyllum, Hk. f v. 80
Cubeba, Vahl	*** 33	82	nedicallogum Wall 01
Cubeba, Walk	,,	82	modicallosum Wall
diffusum, Vahl	••• ,,	96	neenploides Post on
exasperatum, Vahl	,,	96	peepuloides, Wall v. 84, 85, 89
eviguum, Bl	,,	97	penangense, Cas. DC v. 88
fallas, Vahl	,,	96	noticlatum Ul f
galeatum, Cas. DC		80	nlantaainaum Ham
glabrum, Roxb		84	normhuronhullum N E Br 00
glandulosum, Opiz	*** "	85	montulaccidos I amb
	,,	81	nothiforms Wall " 00
Griffithii, Cas. DC	"	87	
Guigual, D. Don	,,	88	pothoides, Wall v. 86, 96
Hamiltoni, Cas. DC	,,		pusillum, Bl v. 99
Happium, Ham	••• ,,	86	retrofractum, Vahl " 96
Hookeri, Miq	,,	88	rhytidocarpum, Hk. f ,, 92
hyalinum, Wall	,,	97	ribesioides, Wall " 81
Hymenophyllum, Miq.	,,	93	rostratum, Rozb ,, 87
indicum, Miq insulare, Cas. DC	••• ,,	95	sarmentosum, Miq ,, 98
	,,	91	sarmentosum, Wall ,, 83
javanicum, Cas. DC.	,,	82	saxatile, Wall ,, 99
khasian'um, Cas. DC.	,,	89	Schizonephros, Cus. DC ,, 79
læve, Vahl	,,	96	Schmidtii, Hk. f v. 89,96
lanatum, Rozb	,,	82	Siriboa, Heyne v. 86
lanatum, Wight	,,	93	Siriboa, Linn ,, 85
lanceolatum, Roxb	v. 8	2, 85	? Strium, Cas. DC ,, 92
latifolium, Hunter	v.	83	stylesum, Miq ,, 88
leptonema, Hk. f	,,	91	subpeltatum, Willd " 95
777-11	,,	95	Suipiqua, Ham ,, 96
leptostachyum, A. Rich.		95	sumatranum, Cas. DC ,, 81
Lonchites, R. & S	,,	90	sylvaticum, Rosb ,, 84
Lonchites, Wall. v. 82	2. 85. ຮ	8, 92	sylvestre, Lamk ,, 93
longum, Linn	v	83	sylvestre, Lour ,, 96
longum, Bl	,,	84	syringæfolium, Vahl " 96
longum, Miq		96	thermale, Vahl ,, 96
macrostachya, Miq. (lap			Thomsoni, Hk. f ,, 87
O L. L. L.		85	Whataitesii Can DC 99
Maingayi, Hk. f	,,	80	trichostachyon, Cas. DC. ,, 80
	••• ,,	90	tuifolium Wille OP
	,,	81	things win Min O1
Malamiri, Roxb	*** ;;	96	tuiniaum 2 Hank 00
Malamiris, Linn	,,	92	deriniaum Port
Malamiris, Roxb	"4		wasaulonum Wall 97
Malamiris, Wall	₹. 9	96	9 manufarm Wall (10
manillanum, Miq	▼.	84	Walleri Mir
maritimum, Bl	••• ,,		Walkers, Miq ,, 94. Wightii, Miq 94.
miniatum, Bl	,,	85 95	
moluccanum, Spreng.	,,	85	Wightii, Miq v. 93, 94
Mullesua, D. Don	••• ,,	87	seylanicum, Miy v. 91
muricatum, Bl	,,	82	Zuccarinii, Cas.DC ,, 96
nepalense, Miq	,,	89	an, Hk. f. & T ,, 89

r				
_	Vol.	Page 78	Pithecolobium vo	l. Page
PIPERACEÆ			confertum, Benth ii	
PIPEREA		78	contortum, Mart ,,	
Piptadenia, Benth	. ii.	289	dulce, Benth ,,	
oudhensis, Brand		289	falcifolium, Hassk ,,	
Piptanthus, D. Don	. ii.	62	fasciculatum, Benth ,,	304
nepalensis, D. Don	. ,,	62	geminatum, Benth ,,	
Piptatherum æquiglume,			lobatum, Benth ,,	
Munro	. Vii	. 234	microcarpum, Benth "	
annulatum, Raddi	. ,,	21	montanum, Benth ,,	
confine, Schult	. ,,	21	nitidum, Benth ,,	
holciforme, Hk. f. & T	. ,,	234	subcoriaceum, Thw,	
laterale, Munro	. ,,	234	umbellatum, Benth ,	
molinioides, Boiss	. ,,	234	PITTOSPOREE ii	
punctatum, Beauv	. ,,	21	Pittosporum, Banks i	
soongaricum, Duthie	. ,,	234	abyssinicum, Hochst ,,	
soongaricum, Munro	. ,,	234	ceylanicum, Wight , ,,	199
strictum, Munro	. ,,	234	dasycaulon, Miq ,,	199
sp., Str. & Wint		23±	P densiflorum, Putterl ,,	199
Piptoclaina malabarica, G			eriocarpum, Royle ,,	10 9
Don	, i v .	149	ferrugineum, Ait ,,	199
supina, G. Don	. ,,	149	ferrugineum, Putterl "	200
Piptostylis indica, Dalz	•	505		9, 618
Pipturus, Wedd	. v.	589	glabratum, Lindl i.	198
incanus, Wodd		589	humile, Hk. f. & T ,,	198
mollissimus, Wedd		589	Mannii, Hk. f "	199
velutinus, Wedd		589	nilghirense, W. & A ,,	198
Pircunia Lathenia, Moq		21	Rumphii, Putterl ,,	200
Pirigara (Pirigarda) valida			Senacia, Putterl ,,	199
Bl	**	511	tetraspermum, W. & A ,,	198
Pisonia, Linn	•	710	Pituranthos, Viv ii	. 679
aculeata, Linn		711	nuda, Benth ,,	680
alba, Spanoghe		711	Thomsoni, Clarke ,,	680
excelsa, Bl		711	Pityranthe, Thw i.	382
Georgina, Wall		711	verrucosa, Thw ,,	382
? inermis, Forst		711	Pladera decussata, Roxb iv	. 104
macrocarpa, Presl		711	fastigiata, Arn ,,	100
? malabarica, Poir		711	perfoliata, Roxb ,,	104
? mitis, Linn		711	pusilla, Roxb ,,	100
morindæfolia, Br	•••	711	pusilla, Thw ,,	100
racemosa, Wall	•••	711	sessiliflora, Boxb ,,	104
umbellifera, Seem		711	? virgata, Griff "	105
villosa, Poir		711	virgata, Roxb ,,	103
PISONIE	• -	708	Plagiolytrum calycinum,	
Pistacia, Linn	. ii.	13	Nees vi	. 287
integerrima, Stew	. ,,	13	filiforme, Nees ,,	288
Vitez, Linn	• -	585	unidentatum, Nees "	288
Pistia, Linn	_:	496	Plagiopteron, Griff i.	399
Stratiotes, Linn	. "	497	fragrans, Griff "	3 99
Pisum arvense, Linn	• •	181	Plagiotaxis Chickrassia, Wall. i.	568
sativum, Linn		181	grandiflora, Wall ,,	552
Pithecolobium, Mart	•••	802	velutina, Wall ,,	56 8
affine, Baker		304	Planchonia, Bl ii.	
anamallayanum, Bedd		305	littoralie, Van Houtte "	511
angulatum, Benth		306	littoralis, Miers ,,	511
bigeminum, Benth		303	PLANTAGINEÆ iv	
bubalinum, Benth		304	Plantago, Linn iv.	
Clypearia, Benth		305	amplexicaulis, Cav ,,	706
J Pour Lu, Domm	. ,,			

Plantago	Vol.	Page	Platanthera	Vol.	Page
arenaria, Done	. iv.	7Ŏ7	obcordata, Lindl		163
argentea, Desf	. ,,	707	O-1111 F1 11	,,	142
asiatica, Linn		705	A 1 132 . 307 31	,,	153
attenuata, Wall		706	rhunchocarna Thw	•• ,,	145
Bauphula, Edgew		706		. "	187
brachyphylla, Edgew		706		i. 146,	
ciliata, Desf		707	Schischmareffiana, Lindl.		130
decumbens, Forsk		707	1 4 7 . 10		156
eriantha, Done	•••	707	O T 31	,,	187
erosa, Wall		705		. ,,	166
gentianoides, Done	••	706		. v.	594
Jan Million William	•••	703			594
Tamaskul Dask		707	l	. ,,	594
Indiana (Jan Day)	••	706			594
7	• • • • • • • • • • • • • • • • • • • •	707		,,	586
	••		O. 100 12 1 361	. 1.	
lanceolata, Linn	. ,,	706		. ,,	590
longiscapa, Jacq	, ,,	705		,,	590
major, Linn	, ,,	705		",,	586
ovata, Forsk	. ,,	707		i▼.	611
Psyllium, Linn	. ,,	707		., iv.	596
pumila, Willd	,,	707	Platychæte glaucescens, Bois	8. ili.	
remotiflora, Stocks	,,,	706		. ,,	300
salina, Done	,,,	706	Platyolinis, Benth	▼.	708
Stocksii, Boiss	,,,	706	gracilis, $Hk. f.$ v. 76 Kingii, $Hk. f.$,, 76	08, vi.	188
stricta, Schousb	, ,,	708	Kingii, Hk . f ,, 76	08, "	183
tibetica, Hk , f . \mathcal{S}^{r} T		706	Platynema laurifolium,		
_ <i>sp</i> , Griff		708	'W. & A	. i.	418
PLATANACEÆ		594	Platystemma, Wall	. i⊽.	361
Platanocarpum cordatum,			majus, Wall	. ,,	36 L
	iii.	22	violoides, Wall		361
subtitum, Korth		22	Platystigma, Br		381
Platanthera acuifera, Lindl.		147	myristiceum, Br	,,,	381
acuminata, Lindi		153	Platystoma, Beauv	•	611
affinis, Wight		164	africanum, Beauv		6:1
i- 1 ? J1		155	flaccidum, Benth		611
brachyphylla, Lindl	• • •	15l	Plecospermum, Tr-cul		491
	1.2,		andamanicum, King		491
1.1 19	vi.	142	cuneifolium. Thw		538
		164	spinosum, Trecul		491
Championi, Lindl		153	Plectocomia, Mart	•	477
clavigera, Lindl	"	143	assamics, Griff		479
commelinifolia, Lindl			assamica, Hk		478
constricta, Lindl		161			479
cordifolia, Lindl	"	167			478
cubitalis, Lindl	"	157	elongata, Griff		479
densa, Lindl	"	153	geministoru. H. Wendl		478
galeandra, Rohb. f	"	163	Griffithii, Becc		478
geniculata, Lindl	"	138	himalayana, Griff		478
gigantea, Lindl,	,,	137	khasyana, Griff		
Heyneana, Lindl jantha, Wight	,,	148	macrostachya, Kurz	• • • • • • • • • • • • • • • • • • • •	478
jantha, Wight	,,	164	montana, Hk. f. & T	•	478
latilabris, Lindl	"	153	Pleotocomiopsis, Becc		479
linifolia, Lindl	,,	151	geminiflorus. Becc	• • • • • • • • • • • • • • • • • • • •	479
longibracteata, Lindl	,,	166	paradoxus, Recc	. ,,	480
lucida, Lindl	"	133	Wrayii, Beec		480
lutea, Wight	"	164	Pleotranthus, L'Herit		616
marginata, Lindl	,,	150	amænus, Wall	. ,,	615
marginata, Wall	**	135	aromaticus, Roxb	. ,,	625

Plectranthus	Vol	Page	Plectranthus	Vol.	Puga
asper, Spreng	iv.		scrophularoides, Wall.		616
barbatus, Andr	,,	645		, ,,	626
Barrelieri, Spreng.	,,	608	secundus, Roxb	••• ,,,	621
? bullatus, Benth	,,	619	Stocksii, Hk. f	,,	618
caninus, Roth	,,	625	Stracheyi, Benth	,,	618
capillipes, Benth	,,	619	striatus, Benth	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	618
carnosus, Sm	,,	627	striatus, Hk. f. & T.	"	618
Coetsa, Ham	,,	619	striatus, Wight	,,	617
Coetsa, Thw	,,	620	strobiliferus, Roxb.	,,	627
coleoides, Benth	,,	622	subincisus, Benth	,,	621
coloratus, D. Don	,,	610	ternifolius, D. Don	,,	621
comosus, Sims Concan, Hk. f. & T.	,,	625	P thumiflorus, Spreng.	,,	61 4
Concan, Hk. f. & T.	,,	618	tristis, Spreng	,,	613
cordifolius, D. Don	,,	621	tuberosus, Bl	,,	625
orenulatus, Hk. f	,.	623	urticifolius, Hk. f	,,	622
divaricatus, Weinm.	,,	621	virgalus, D. Don	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	615
dubius, Spreng	,,	627	Walkeri, Arn	··· ,,	617
Forskohlii, Willd	,,	625	Wightii, Benth	,,	619
fruticosus, Wight	··· ' ,,	623	Wightii, Grah	,,	618
Gardneri, Thw	,,	622	zeylanious, Benth	,,	622
Gerardianus, Benth.	,,	617	sp., Griff	••• ,,	655 620
graciliflora, Benth.	,,	618	sp., Ht. f. & T	,,,	
Griffithii, Hk. f	,,	623	Plectronia, Linn	iti.	131 132
? Helferi, Hk. f	,,	623	didyma, Brand	••• ,,	132
hians, Benth	,,	617 618	didyma, Kurz	"	133
hispidus, Benth Hookeri, Clarke	,,	620	glabra, DC neilgherrensis, Bedd.	"	138
	••• ,,	621		ji.	726
2 22	,,	609	1 1 1		726
longitubus, Miq	,,	616	Pleiogyne cardiosperm		
Macraei, Benth		620	Edgew	iii.	316
macranthus, Hk. f	,,	616	Pleione birmanica, Rohb.		
Maddeni, Benth	••• ',,	620	(vide Calogyne)	, ▼.	840
melissoides, Benth	,,	620	? diphylla, Lindl	,,	841
menthoides, Benth.	,,	620	humilis, D. Don	,,	841
micranthus, Spreng.	,,	612	lagenaria, Lindl	,,	841
mollis, Spreng	,,	621	maculata, Lindl	,,	851
mollissimus, Wall	,,	615	præcox, D. Don	,,	840
monadelphus, Heyne	,,	624	Wallichiana, Jard. Flor	ır. "	840
P montanus, Benth.	,,	624	Wallichii, Lindl	,;	840
montanus, Wight	,,	617	Pleotheca bifida, Wall.	111.	76
mysorensis, Heyne	,,	625	_ cylindrica, Wall	;	76
nepetæfolius, Benth.	,,	619	PL-BANDREE	. 11.	721
nigrescens, Benth	,,	617	Plesmonium, Schott	vi.	518 519
nilghirious, Renth	,,	619	dubium, Schott	*** ***	518
nudiflorus, Wild	,,	626 617	margaritiferum, Schott.		248
oblongifolius, Wall	,,	622	Pleuranthesis, Benth Pleurogyne, Eschsch	•	119
Parishii, Hk. f	,,	612	brachyanthera, Clarke		120
parviflorus, Br Patchouli, Clarks	,,	624		,,	120
pulneyensis, Hk. f.	,,	617	carinata, Engew	,,	120
repens, Wall:	,.	61:	himalayensis, Klotz.	,,	120
rivalaris, Wight	••	617	? minor, Benth	,,	120
rotundifolius, Spreng.	,,	624	spathulata, A. Kerner	, ,,	120
rubicundus, D. Don	,,	615	Stellerians, G. Don	••• ' "	120
rugosus, Wall	••• ,,	620	Thomsoni, Clarke	,,	120
s-abrellus, Benth	,,	617 '	sp., Hk. f. & T	,,	120
			-		

· Vol. Pag	e Plumbago Vol. Pas	76
Pleuroplitis caucasica, Rupr. vii. 140		
centro-asiatica, Griseb ,, 14		
ciliata, Schmidt , 140		1
lancifolia, Regel, ,, 14		1
Langsdorfiana, Trin ,, 146	6 • acuminata, Roxb 64	1
major, Regel ,, 14	acutifolia, Poir, 61	1
microphylla, Regel ,, 147	7 Plumerier iii. 621, 63	2
plumbea, Steud ,, 146		
Quartiniana, Regel ,, 146		
Schimperi, Regel ,, 147		
violacea, Steud ,, 14		7
Pleurospermum, Hoffm ii. 709		
angelicoides, Benth ,, 703		7
apiolens, Clarke ,, 70		
Benthami, Clarke ,, 703	1	-
Brunonis, Benth ,, 700		_
Candollia, B. nth ,, 703		
cicutarium, Lindl ,, 70	- 1	
densifiorum, Benth ,, 70		
dentatum, Benth ,, 70		
Govanianum, Benth ,, 70		
Hookeri, Clarke ,, 70		
pumilum, Benth " 70	-	
? rotundatum, Benth ,, 70		
sikkimense, Clarke ,, 702		
stellatum, Benth. (see Errata), 70		
stylosum, Clarke ,, 70	- ' n'e a ' ' no	
Pleurostylia, Wight i. 61		-
Heynei, W. & A ,, 61		
Wightii, W. & A ,, 61'	, , , , , , , , , , , , , , , , , , , ,	
Pleurothallis purpurea, D. Don v. 760		
Plinia pedunculata, Linn. f. ii. 50	- 1 - 4 - 4	1
rubra, Linn ,, 500 Plocoglottis, Bl vi. 21, 177, 176		
		-
	0 L.,1L.,, <i>Ti</i> .,,,, 99	_
	2 Lullian Dathia 39	
	4 1 11 - Qt - 6 Wins 34	_
z total and orogana, izotelli iii ii	2 00000000, 202. 0 11. 22.	
	o l 9 Januario Doublio 34	2
	, , , , , , , , , , , , , , , , , , , ,	
6.7:-1 DC	- (' '3' - ' '10	7
fundamental Parth 979		8
1 41 T		8
lance lata, Oliv , 27		9
1 Clarks " 98	6 chinensis, Rottl ,, 29	
linearifolia, Clarke ,, 273	3 cilianensis, All " 32	
ovalis, DC ,, 27		_
tomentosa, DC ,, 275	2 ciliata, Roxb ,, 31	_
Wallichiana, DC ,, 275	2 compressa, Griseb ,, 31	•
Plukenetia, Linn v. 464	4 compressa, Hk. f. & T ,, 34	-
corniculata, Sm ,, 46	1 contracta, Retz ,, 29	-
Plumbageæ, iii. 478	8 convoluta, Heyne ,, 31	
PLUMBAGINEE iii. 470	8 Corana, Ham ,, 31	
Plumbago, Linn iii. 480	o coromandelina, Koen ,, 32	
auriculata, Bl ,, 490	9/	
coccinea, Boiss ,, 481	1 cristata, Withering ,, 80	Ø

Pos	₩-1	n	l Dee	W-1	D
		Page	malabarica, Klein		Page
4		320 313		∀i i	332
min animadalas Data	••	325	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	···, »	299
Andreiten Die	"	299			334
O Janes Janes III and am	••	819	1	. ,,	239
Accordates to the territory		315	منت مشا	. ,,	320
Alam dua Titam		316	multiflora, Roxb v	i. 317	
Jina Jan Dash		316			. 841
diamalan Winha		318	Trans.		832
Alambana Main		337	1 771 0 8 70		344
diarrhena, Sobult		316	nepalensis, Hk. f. & T.	ii. 344	
distans, Heyne		318	_ , , , , , , , , , , , , , , , , , , ,		. 846
distans, Linn		347	1	,,	828
duplo-ciliaris, Roxb	• • •	813	1 14.1 3 in T 1	,,	808
dura, Scop		335		. ,,	818
effusa, Royle		343	77	•	316
elegans, Roxb	"	318		,,	818
elegans, Wight & Ham	"	320	1	,,	828
elegantula, Kunth	"	318	1	,,	818
elongata, Willd	"	319		,,	355
Eragrostis, Cav		320	Daine Daine	,,	337
Eragrostis, Linn	,,,	321	Dain Dain	,,	298
Falconeri, Hk. f	"	342	manada Dank	,,	314
ferruginea, Thunb	,,	324	manner Doof	,,	323
flexuosa, Wahlb	,,	342	T 17 17 1. 17	,,	837
flewuosa, Hk. f.& T. vii. 340,	343.			,,	328
flexuosa, Roxb	• •	320		. ,	837
flexuosa, Royle	"	341	The Address The AA1	,,	321
Resuosa, Str. & Wint	"	341	T. 37. 3. D.	. ,,	828
Gammieana, $Hk. f.$		345	1	,,	837
gangetica, Roxb	"	318	1.1.1	,,	309
glabra, Rottl	"	322	D1 . 17	,,	328
glutinosa, Roxb	"	315		,,	323
hansiana, Royle	"	346	T. 1 17	,,	315
himalayana, Nees	"	344		,,	315
himalayana, Hk. f. & T	,,	343	polycoles, Stapf	,,	842
hirsuta, Bottl	"	315	polymorpha, Br vi		, 319
hirtiglumis, Hk . f	"	343	? polymorpha, Koen. ,	000	, 322
hyemalis, Ham	,,	317	pratensis, Linn	vii.	239
incurva, Rottl vii.	315,			,,	340
incurvata, Rottl	vii.	313		,,	329
indica, Koen	"	323		,,	318
interrupta, Br	"	319		,,	317
interrupta, Lamk	,,	316	pseudo-pratensis, $Hk.f.$.	"	340
japonica, Thunb	,,	317	pulchella, Wall	,,	319
khasiana, Stapf	"	343		,,	323
Koonigii, Kunth	"	316			308
laevis, Heyne	~"-	318		i. 833	
laevis, Rottl vii.	315,			∀ ii.	
lagopodioides, Kunth	V ii.	334	70 7 37 .	,,	320
lagopoides, Nees	"	295		,,	345
Laka, Ham	"	317		,,	317
latifolia, Forst. f	,,	332			318
latifolia, Wall	"	316		i. 326	
lass, Duthie	"	341			299
laza, Hk. f. & T	>>	841	serotina, Str. & Wint	•••	342
malabarica, Heyne	"	815	setacea, Hoffm	. ,,	840

Des		_	D 1 10			
Pos		. Page		V	ol. P ri.	age
setucea, Rottl		. 815		1	7j.	80
soongarica, Boies		337		••	,,	80
speciosa, Ham	23	817		••	"	81
sterilis, Bieb	,,	841		••	"	82
strigosa, Hoffm	,,	340		••	,,	80
subsecunda, Ham	,,	320	$oxdot{ extbf{microphyllus}, Lindl.}$.		"	81
subtilis, Kar. & Kir	,,	337	microphyllus, Wall		11	81
Telphulia, Ham	"	315		••	,,	81
tenella, Br	,,	317	similis, Bl		,	81
tenella, Heyne	,,	323			,,	81
tenella, Linn. ·	, 10	315	Podolasis, N. E. Br			550
tenella, Roxb	"	315	-41-14 4 37 37 33			550
tenellula, Kunth	٠,,	317	Podolotus hosackioides, Royl			23
tenuifolia, A. Rich	,,	322	Podophyllum, Linn			112
tibetica, Munro	11	339	73		1	112
tortuosa, Spreng	-	320	1		"	12
	93	344		-		259
	,,	320			•	
4 1 1 1 2 4 1	"	344	virginitum, Link			49
trivialis, Griseb	9,70		Podostemon, Michw			64
		, 341	acuminatus, Wedd	٠,		66
	V1 1.	334	algæformis, Benth	٠,	,	65
unioloides, Retz	.".	317	dendroides, Thw		,	95
variegata, Jacquem vii.			dichotomus, Gardn			64
verticillata, Cav	VII.		elongatur, Gardn	٠,	,	65
virgata, Roth	,,	298	? Gardneri, Harv	. ,	,	66
viscosa, Retz	"	315	Griffithii, Gardn	. ,		64
viscosa, Wall	"	318	Griffithii, Wall	. ,	,	64
Zizania, Jacqueni	,,	3 30	griseus, Gardn			66
sp., Hk. f. & T., vii. 337,	342,	343,	Hookerianus, Wedd			65
	344	, 346	Johnsonii, Wedd			66
sp., Str. & Wint			microcarpus, Wedd			66
sp., Wall		346	minor, Benth			67
POACEÆ			olivaceus, Gardn	•	•	66
Podadenia, Thw	٧.	422	pterophyllus, Benth		•	67
sapida, Thw		423	rigidus, Gardu	-	,	64
my 1: 1: 35 31	"	423	selaginoides, Benth		•	68
Podalyria bracteata, Koxb	ii.	248			•	64
		56			•	65
Podalyrieze	11.		subulatus, Gardn Wallichii, Br		•	67
Podanthera pallida, Wight			7777-1411 (Daniel	•	•	64
Podianthus arifolius, Schnitz			Wightii, Gardn			61
PODOCABPEE	▼.	644	PODSTEMONACEE		-	
Podocarpium, Benth	ii.	165	Posciloneuron, Bedd			78
Podocarpus, L'Herit	▼.	619	indicum, Bedd			78
agathifolia, Bl	"	649		٠.,	•	78
bracteata, Bl	"	649	Pogochilus, Falc		-	88
chinensis, Wall	"	649	Pogonanthera, Bl	. ii		50
cupressina, Br	"	650	pulverulenta, Bl	٠,	••	50
Horsfieldii, Wall	,,	650	Pogonatherum, Beauv	. VI		41
imbricata, Bl	,,	650	contortum, Brongn	. ,		09
latifolia, Wall	"	649	crinitum, Trin	. ,,	•	41
macrophylla, D. Don	,,	649	majus, Griseb	. ,,	, 1	42
macrophylla, Wall	"	650	polystachyum, Kunth		1	41
neriifolia, D. Don	"	649	polystachyum, R. & S		1	41
polystachya, Br	"	650	refractum, Nees		1.	41
Podochilas, Bl	٧i.	80	rufo-barbatum, Griff		•	42
acicularis, Hk. f		82	saccharoideum Beauv		1	41
	;, ▼.	726	? tenue, Edgew	-		47
bicolor, Miq	٠.	. = 0	, 22-8	-);		•

Pogonatherum	W-1	Da	Pogostemon	Vol	Page
~ ~ .~	- **	Page 1:1	plectranthoides, Desf.	iv.	683
T			pubescens, Benth	, ,,	633
1.0 117 ⁷ 1 4		119	purpurascens, Dalz.		632
		121	purpuricaulis, Dals.		633
	•	121	reflexus, Benth	,,	637
	-	119	rotundatus, Benth	,,	636
A-1-11'A		121	rotundatus, Wight		636
O		120	rupestrie, Benth	,,	634
juliana, Wall		119	speciosu, Benth		637
macroglossa, Hk. f.		120	strigosus, Benth	•	636
maculata, Par. & Rehb. f.		120	suavis, Ten	,,	634
37 72 TD1		121	travancorious, Bedd.	,,	637
plicata, Lindl		119	tuberculosus, Benth.	,,	633
O		120	verticillatus, Miq	,,	640
velutina, Par. & Rohb. f.	"	119	vestitus, Benth	,,	636
sp., Griff vi	120		villosus, Benth	,,	632
	vii.		Wightii, Benth	,,	635
Pogonostylissquarrosa, Berto'		635	sp., Hk. f. & T	,,	635
Pogonotrophe assamica, Miq.		526	Poinciana, Linn	ii.	260
aurantiaca, Miq		532	elata, Linn	,,	260
borneensis, Miq. (lapsu		002	pulcherrima, Linn	,,	255
170: \		527	regia, Bojer	,,	260
dasyphylla, Miq.	•	526	Roxburghii, G. Don	,,	257
flavidula, Mig	.,	531	Poinsettia pulcherrima,	R. "	
alandalilam Mia		592	Grah	v.	289
		527	Poivrea Romburghii, DC.	ii.	452
		526	Polanisia burtporensis		
macrocarpa, Miq		534	Munro	' i.	169
		527	Chelidonii, DC	,,,	170
pubigera, Miq		528	dodecandra, DC	,,	170
reticulata, Mig	•••	528	felina, DC	,,	170
	•	528	heterophylla, Wali	,,	170
sumatrana, Miq		532	icosandra, W. & A	,,	170
verrucosa, Miq	• • •	528	Leschenaultii, DC	,,	170
Pogostemon, Desf	• **	631	Schraderi, DC	,,	170
amarantoides, Benth		634	simplicifolia, Camb.	,,	169
atropurpureus, Benth		636	viscosa, DC	,,	170
brachystachys, Benth		637	Polemoniace#	iv. 133	
comosus, Miq		632	Polemonium, Linn	iv.	
elsholtzioides, Benth	• • •	634	coeruleum, Linn	,,	13 3
fraternus, Miq		635	Pollia, Thunb	vi.	367
frutescens, Grah	• • • • • • • • • • • • • • • • • • • •	633	Aclisia, Hassk	,,	367
Gardneri, Hk. f	•••	632	glaucescens, Teysm. & Bi		367
	•	633	indica, Thw	,,	368
glaber, Benth Heyneanus, Benth		633	japonica, Hance	,,	368
hirautus. Benth	•••	635	pen tasperma, Clarke	,,	368
hirsutus, Wight	••	635	purpurea, Hort	,,	383
hirsutus, Wight imberbe, Wight	••	637	sorzogonensis, Endl.	,,	367
intermedius, Wall		633	su bumbellata, Clarke	,,	268
mollis, Benth	• • • • • • • • • • • • • • • • • • • •	635	thyraiflora, Endl	,,	367
paludosus, Benth		635	Polliez	vi.	366
paniculatus, Benth	-	631	Pollinia, Trin	vii	
parviflorus, Benth		632	argentea, Trin	,,	111
Patchouli, Pelle	••	633	argentea, Balans	,,	112
Patchouli, Clarke	• • • • • • • • • • • • • • • • • • • •	624	articulata, Trin	,,	109
Patchouli, Hook		634	birmanica, Hk. f	,,	113
petiolaris, Benth	••	635	brevifolia, Spreng	,,	165
	. ,,			,,,	

				•
Pollinia .	Vol.	Page	Polyalthia Vol. P	BOA
ciliaris, Spreng		146	acuminata, Thu i.	63
	,,	116	argentea, Hk. f. & T ,,	67
	., ,,	116	bifaria, Benth. & Hk. f "	62
	,,	114	biglandulosa, Benth. &	
	,,	112	• Hk. f • ,,	65
	19	117	cardiopetala, Dalz "	75
	,,	210	cauliflora, Hk. f. & T ,	66
	,,	129	cerasoides, Benth. & Hk. f. "	63
	•• ,,	114	oinnamomea, Hk. f. & T. "	65
Alifornia Dumana	,,	167 299	coffeoides, Benth. & Hk. f. "	в2 67
Al-Landa An ITmale	,,	112	costata, Hk. f. & T ,	63
A	,,	165	fragrans, Benth. of Hk. f. ,,	51
O failer Door	•• ,,	167	fruticans, A. DC ,, hypoleuca, Hk. f. & T ,,	63
failes Danch	•••	114		64
fulue Onnone	,,	193	Variati Danth le Ul. 6	64
	,,	115	lougifolia, Benth. & Hk. f. ,,	62
Charles Canana	. ,,	188	macrophyila, Hk. f. & T. "	66
hirtifolia, Hack	,,	111	macrophylla, Bl ,,	74
imphanhin Mass	,,	117	magnoliæftora, Maing "	64
inner in Director	,,	118	Moonii, Thw ,,	66
	,,	117	nitida, Benth. & Hk. f "	64
japonica, Miq	,,	118	obliqua, Hk. f. & T ,,	67
lancea, Nees	. ,,	116	persicufolia, Benth. & Hk. f. "	66
laza, Nees	,,	116	rufescens, Hk. f. & T "	66
	. ,, .	139	solerophyllya, Hk. f. & T. "	65
	,,	116	simiarum, Benth. & Hk. f. "	63
	,,	111	suberosa, Benth. & Hk. f ,,	65
	,,	141	a manhana Tamb	245 245
	. ,,	116 116	James 4 ann 307 a 11	245
monantha, Hk. f. & T		116	3101 727 0. 4	245
	,,	107	1	245
nepalensis, Benth nuda, Trin	• •	117	and the Tomb	245
pallens, Hack	,,	110		246
pallida, R. & S	••	188	staticæformis, Hochst. &	
phaeothrix, Hack		112		246
polystachya, Spreng.		141		213
quadrinervis, Hack		110		244
Ridleyi, Hack ,		114	Benthamii, Wall ,, 2	245
setifolia, Nees		109	depressa, DC ,, 2	245
speciosa, Hack		113	1 0001510,9 0100000, 11	245
Stapfii, Hk. f		115	Loeflingise, Benth. & Hk. !. ,, 2	245
striata, Spreng	. ,,	136	Polychilus Cornu-cervi, Bred. vi.	29 320
		111	1 009 00 100 to 001 to 0, 22.	319
			1 009000111101 13 18 111 111 111	321
		115	77 00000704, 251	156
vaginata, Spreng		165	1 Dijuingan, semiji	457
velutina, Hack	,,,	113 110		200
villosa, Munro		116	1 Ulygan, Dillion.	202
	,,	117	00 A BOTITION * 3.1 cocks	200
	,, iii	299	Callingon, 1100000 //	204
		162	Arnottiana, Hassk ,,	207
reticulata, Nees		183	arvensis. Willd "	204
Polyalthia, Bl	3"	62	brachystachya, DC ,,	204
? aberrans, Maing		67	brachystachya, Bl ,,	204
	. , ,,	- •	• • •	

Polygala	Vul	. Page	Polygala	Vol	Page
70. 1	i.		rosmarinifolia, W. & A	i.	204
	,,	205	rosmarinifolia, Thw	;,	203
	,,	203	Rothiana, W. & A	"	204
Usash	,,	207	scabra, Edgew	"	202
and and Manual	,,	201	serpyllifolia, Poir	"	205
alimamaia Tima	,,	204	sibirica, Linn	"	205
- Maria Tria Williams	,,	204	supina, Schreb	"	202
all lacker Tilmen	,,	207	telephioides, Willd	"	205
Ofrom Hearly	,,	203	Ptinctoria, Vahl	"	201
	,,	201	tomentosa, Vahl	"	203
2 14 TO1	"	206	tranquebarica, Wight	"	204
3 XI7-11	,,	206	tranquebarica, Mart	"	204
3/	,,	202	triflora, Oliv	"	203
ologono Woll	,,	205	triftora, Hassk	"	204
alamania Wisin	,,	203	triflora, Linn	"	204
erioptera, DC	,,	203	triphylla, Ham	"	201
eumekes, Hassk	,,	204	umbro.a, Mart	"	206
exiyua, Hassk	,,	204	Vahliana, DC	,,	203
formanda. Damla	,,	201	varians, Mart	"	206
Onundiana Wall	,,	202	vulgaris, Thunb	"	205
-1-1 Tla	,,	204	Wallichiana, Wight	"	203
	. "	201	Wightiana, Wall	"	203
glaucoides, Linn	,,	203	sp., Griff	"	205
-1	,,	204	POLYGALEÆ	ï.	200
alamanata Taun	"	206	POLYGONACEÆ	₹.	22
alom and to The	"	205	POLYGONATEE	vi.	300
2:0 TTL 517: A	,,	204	Polygonatum, Tourn	٧i.	319
anamailada Wasala	. ,	203	brevistylum, Baker		319
Hauntona Wall	,,	205	Cathcartii, Baker	"	320
7 7	"	203	? ciliatum, Royle	"	320
Hohenackeriana, Fisch.			cirrhifolium, Royle	"	322
7/	',,	2 02	geministorum, Dene	,,	320
Lungalanca Musab	,,	203	Govanianum, Royle	,,	319
hyalina, Wall	,,	201	graminifolium, Hook	"	319
innerion Homes	,,	205	Griffithii, Baker	"	320
DA	,,	201	Hookeri, Baker	"	320
khasiana, Hassk	,,	203	Inglesii, Royle	"	322
White it is and	"	204	Jacquemontianum, Kunth	"	321
leptales, DC	,,	202	Kingianum, Coll. & Hemsl.	"	322
7:	,,	206	leptophyllum, Royle	"	321
linarifolia, Heyne	,,	204	multiflorum, Allioni	"	319
linearifolia, DC	,,	206	nervulosum, Baker	"	319
macrolophos, Hassk	. ,,	205	officinale, Allioni	"	319
macropetala, Hassk		206	oppositifolium, Royle	,,	320
macrostachya, Hasak		204	punctatum, Royle	"	321
monopetala, Camb		205	roseum, Hook	"	321
mucronata, Thw		203	sibiricum, Baker	"	32 2
multibracteata, Wall		204	verticillatum, Allioni	"	321
Myrsinites, Royle		205	Polygonearum familiæ sedi-	••	
obtusata, DC		203		v. 22	, 54
oligophylla, DC		202	Polygonum, Linn	₹.	23
pedunculosa, 'lhw		205	acaule, Hk . f	**	53
persicariæfolia, DC		202	acidum, Pall	"	49
procumbens, Roth		206	acre, H. B. K	"	40
procumbens, Roth		204	acutatum, Lehm	'))	55
? prostrata, Willd		204	adenotrichum, Wall	"	44
ramosa, Hb. Wight	•••	204	affine, D. Don	"	33
		-	· ·		

Polygonum	W-1 1	n	Polymony	•		
- # OA L	Vol. 1	96	Polygonum		Vol. F V.	,eko
agme, steps		31	crispatum, Clarke	•••	₹.	
affine, Wall	,,		cymosum, Roxb	•••	**	44
	,,	41	cymosum, Trev	•••	,,	55
	,,	42	delicatulum, Meissn.	•••	,,	24
	,,	25	dibotrys, D. Don		"	55
alpestre, Wall	,,	25	dichotomum, Bl	•••	"	48
alpinum, All	,,	40	dioicum, Ham	•••	٠,,	55
alpinum, Meissn	,,	10	divaricatum, Vill		,,	49
altissimum, Moench	. ,,	80	Donianum, Spreng.		"	38
1/ W-lane	., ,,	33	Donii Maissa			38
		26			"	38
	••	30	Danii Winha	•••	"	39
1 1 1 June 7 July		34	D	•••	27	27
		32	77	•••	_"30	
	•• "	31	January T. Commission of Participation of the Commission of the Co		v. 28,	
angustifolium, D. Don .	•• "		dumetorum, Linn	• • •	▼.	54
	•• ,,	37	effusum, Moissn	• • •	"	28
	•• ,,	35	elegans, Miq	•••	"	29
	,,	46	elegans, Roxb	•••	"	29
	▼. 39		emarginatum, Roth	• • •	,,	55
assamicum, Meissn	v.	36	emarginatum, Wall		"	55
auriculatum, Hk. f. & T	,,	47	Emodi, Meissn		"	38
auriculatum, Meissu	,,	44	Fayopyrum, Linn		"	55
	••),	26	filicaule, Wall		,,	25
, 1 N N	,,	27	filisorme, Thunb		"	31
O 1. 2	,,	40	flaccidum, Meissn	•••	"	39
D.,		36	flaccidum, Roxb			38
handrakana Titura	•••	37	flutiatile, Ham		v,"34	
	,,	40	frondosum, Meissn			50
	•• ,,	39	glabratum, Meissn	•••	▼.	48
	,,		alabatum Wall	•••	**	
	,,	37	glabratum, Wall	•••	,	48
	•• ,,	27	glabrum, Willd	• • •	"	34
Biscaticlium (Bisculatiun	3)		glaciale, Hk. f	•••	**	41
Ham,	,,	3 9	glutinosum, Wall	•••	**	35
Bishiræ, Ham	. ,,	37	Goyalpara, Ham	• • •	"	37
Bistorta, Garcke	,,	32	gracile, Ham	• • •	,,	38
brachiatum, Poir	,,	44	gracillimum, Spreng.		,,	32
	,,	31	Griffithii, Hk. f		,,	54
70 . 487 11	• ,,	33	guttuliferum, Miq		,,	42
7 71 14 73 7.	,,	31	Hagei, Royle		,,	54
133	• • • • • • • • • • • • • • • • • • • •	38	Hamiltonii, Meissn		,,	37
1.1 172. /	•••	51	Hamiltonii, Spreng		"	40
	,,	44	hastatum, Murr			52
	,,	32	Hayii, Str. & Wint.	••	1)	50
carneum, C. Koch	. ,,	44	herniarioides, Del	; ;	47, v.	
	•• ,,				v.	28
	٠٠ ;;	52	herniarioides, Str. & Wi			
	,,	42	hirsutum, Ham	• •	**	36
	,,	39	hispidulum, Bl	•••	"	47
ciliosum, Meissn	,,	29	hispidum, Bab	• • •	"	37
cliffortioides, Meissn	,,	28	hispidum, Ham	• • •	"	40
cochinchinense, Meissn		30	Hornemanni, Meisso.	•••	"	37
	. ,,	25	horridum, Roxb	• • •	,,	47
	,,	26	humile, <i>Meissn</i>	•••	"	41
		32	Hydropiper, Linn		"	39
	• • • • • • • • • • • • • • • • • • • •	37	hypostictum, Miq		"	36
conception, constitution	••	53	illecebroides, Meissn.		99	28
	•• "	44	indicum, Hoyne	•••		28
	,,	52	islandicum, Hk. f		"	24
crassifolium.Murr	11	02	10101111111111 1 1 1 1 1 1 1 1 1 1 1 1	•••	11	

D-1			Del		
Polygonum	Vol. P ▼.	age	Polygonum	Vol. P	
	▼,		pildeum, Roxb	. ▼.	80
lanigerum, Br	v	85	plebejum, Br	٠,,,	27
lapathifolium, Linn	**	35	podocephalum, Klotz	,,,	48
lazum, Rohb	**	35	Poiretii, Meissn	. ,,	84
limbatum, Meisen	"	ક્રા	polycephalum, Wall		44
linifolium, Heyne	"	28	polymorphum, Meissn	•••	49
macranthum, Meisen	"	40	mal-akaak-min 177-77	•••	50
, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,		82	D		88
	"	35		•	40
maculatum, Dyer & Trim.	37 -	00	Posumbu, Meissia	,	
Manoræne (Marmoramæ),		37	Posumbu, Thw	• ,,	89
Ham	"		Posumbu, Wall	. ,,	36
Meissneri, Wall	99	34	prætermissum, Hk. f	• ,,	47
Metsianum, Miq	"	42	prostratum, Roxb	. ,,	29
Meyeri, Steud	"	26	pterocarpum, Wall	. ,,	54
micranthemum, Franch	**	29	pulchrum, Bl	. ,,	80
microcephalum, D. Don	"	42	punctatum, Ham		42
microphyllum, Klotz	,,	25	quadrifidum, Ham '		84
minus. Huds	,,	36	quadrifidum, Str. & Wint		85
Miquelianum, Meissn		29	ramoso-spicatum, Klotz		51
	8,"39,		Danta tiam	••	38
	⊽.	50	1	•••	
molle, D. Don		50	recumbens, Royle		25
molle, Hk. f. & T	"		repens, Wall	. ,,	44
molle, Wight	"	50	reticulatum, De Bruyn	• ,,	48
molliæforme, Boiss	"	27	rivulare, Helf	٠ ,,	89
mucronatum, Royle	"	26	rivulare, Koen	. ,,	87
muricatum, Meissn	"	45	rottboellioides, J. & S	. ,,	27
muricatum, Griff	"	47	Rottleri, Roth		39
muricatum, Hk. f. & T	"	47	Rozburghii, Meissn		27
muricatum, Wall	"	47	rude, Meisen	••	49
muticum, Moench	"	31	rugosum, Ham	•••	55
	v. 41.	42	rumicifolium, Royle	••	51
	₹.	35	m. mi nifalia m. Dall	•••	52
nouosum, Pers nummularifolium, Meissn.		53			48
) :	85	monadas Van & Vin		
nutans, Roxb	"	30	rupestre, Kar. & Kir.	• ,,	26
ochreatum, Houtt	"		sagittatum, Linn	• ,,	47
P Olivieri, Meisan	"	27	sagittatum, D. Don	. ,,	47
orientale, Linn	"	30	salicornicides, J. & S	. ,,	26
orientale, Wall	99	80	scabrinerve, Royle	, ,,	34
ovatum, Heyne	,,	44	senegalense, Boiss	. ,,	34
oxyphyllum, Wall	٠,	3 3	sericeum, Pall		52
paleaceum, Wall	,	32	serrulatum, Lagasc		38
paludosum, Griff	"	54	sibirioum, Lawm	•••	52
panduræforme, Ham	,,	45	sibiricum, Linn. f	••	49
panioulatum, Bl	"	48	Sieboldii, Meisan	•••	47
n		39	alama Anni Danili		44
	"	26			88
Paronychia, O. A. Mey	72	26	speciosum, Wall		
paronychioides, C. A. Mey.	"		spherocephalum, Wall		48
patens, D. Don	**	44	sphærostachyum, Meissn	• ,,	82
pedunculare, Wall	**	48	splendens, Klotz	• ,,	32
perfoliatum, Lins	"	46	stagninum, Ham	• ••	87
perforatum, Aitoh	"	41	staticiflorum, Wall		42
perforatum, Meissn	v. 41,	42	stenophyllum, Meissn		32
perforatum, Wall	₹. ′	41	strictum, Allioni	••	36
perpusillum, Hk. f	"	-32	strigosum, Br	•••	47
Persicaria, Linn		35	strigosum, Ham		42
70 - k - / / 787 - 11		84	strigosum, Thw		47
	"	38			55
penoutum, D. Don	**	5 0	taturicum, Linn	"	90

•	GENERAL	INDEX.	743
D-1		•	•
Polygonum	Vol. Page	Polyscias	Vol. Page . ii. 727
tataricum, Wall		acuminata, Seem	
tenellum, Bl		pinnata, Forst	,, 727
	v. 34, 39 v. 32	Polysolenia, Hk. f	
tenue, D. Don	11 12 1	Wallichii, Hk. f	
tinctorium, Ait	90.1	Polyspora axilleris, Chois	
tomentosum, Willd	" 077	Polystachya, Hook:	
tomentosum, Wall torquatum, De Bruyn	″ 90	luteola, Hook	. 01
A	" 59	iuteola, Wight mauritiana, Spreng	. "
duian aulana Wall	" 55		″ O1
tubulosum, Boiss	" 97	ramosa, Garda	
vacciniifolium, Wall	,, 33	Wightii, Rchb. f	. 01
virginianum, Linn	,, 31	seylanica, Lindl	0.7
viscosum, Ham	,, 36	Polystorthia, Bl	
viviparum, Linn	" 31	Polytoca, Br	. v i. 100
volubile, Turoz	,, 55	barbata, Stapf	300
Wallicki, Meissn	,, 43	bracteata, Br	. " 101
Wallichii, Wight	,, 43	Cookii, Stapf	. " 101
	5, 46, 50,	, punctata, <i>tapf</i>	
	2, 58. 54	semiteres, Benth	
Polymnia abyssynica, Linn. f.		Wallichiana, Benth	
Polyodontia (vide Polydontia)		Polytrias praemorsa, Hack	
Polyosma, Bl	ii. 408		. iii. 76 77
fragrans, Benn	,, 408 409	geminata, Hk. f	
ilicifolia, Bl	409	Polyzygus, Dalz	900
integrifolia, Bl	″ 400	tuberorus, Dalz Pomacea, Griff	."
lætevirens, Griff mutabilis, Bl	" 4.0	Pomaderris capsularis, G.Don	
	" 400	Pomasterion japonicum, Miq	
Polyosus latifolia, Bl	iii. 177	Pomatocalpa spicatum, Kuh	
? madraspatana, DC	" 102	& Hasselt	-: 774
Polypara cochinchinensis, Lour	" 1	Pometia, Forst	i. 6 91
Polyphema Champeden, Lour.	v. 542	evimia, Hk. f	
Jaca, Lour	,, 541.	pinnata, Forst	
Polyphragmon flavescens, Kur	siii. 127	tomentosa, Kurz i.	690, 691
Polypleurum orientale, Tayl.	v. 67	ternata, Forst	
Polypogon, Dest	vii. 245	Pommereulla, Linn. f	000
crinitus (lapsu cruentus),	0.7	Cornacopiæ, Linn. f	. 300
Duthie	,, 245	elongata, W. & A	" 284
cruentus, Duthie (vide	245	monæca, Rottl monoica, Wall	່" 9Ω4
crinitus)	" 046	Royleana, Steud	" 984
demissus, Stead	946	Pongamia, Vent	
elongatus, Lagaso	945	acuminata, Grah	0.47
fugas, Nees Higegaweri, Steud	946	amæna, Wall	
Lagasca, R. & S	,, 246	angustifolia, Ham	110
littoralis, Sm	,, 246	atropurpurea, Wall	,, 10 8
maritimus, Duthie	,, 245	cærulea, Grah	
monspeliensie, Desf	,, 245	cana, Grah	
nepalensis, Nees	,, 215	canarensis, Dalz	
paniceus, Lag	,, 245	cassioides, Wall	. 100
polysetus, Steud	,, 245	P caudata, Grab	100
seylanicus, Nees	,, 245	cinerea, Grah	10K
Polyscalis (lapsu Polyscelis)		Corcor, Grab	" 946
capitata, Wall	iv. 723	coriacea, Grah	″ 10A
Sequae, Wall	" 722 " 727	crassifolia, Wall cuncifolia, Grab	" 049
Polyscias, Forst	ii. 727	canegora, orane	,,

Popowia	Pongamia	V ol.	Page	Popowia Vol. 1	Page
State	1 T			ramosissima, Hk. f. & T i.	68
elongata, Grah.	elegans, Grah	,,		ramosissima, Bedd ,,	
Fastensa, Wall	elliptica, Wall	••• ,,		tomentosa, Maing ,,	
Pestensa, Wall					
Serviginea, Wall.		ii.			
Soribunda, Grah.		,,			
glabra, Vent	ferruginea, Wall	,,			
glabra, Vent.	floribunda, Grah	,,			
Sprandsfolia, Grah.		,,			
heterocarpa, Wall.		••• ' ,,		7	
Heyneana, Grah.		•••			
Heyneana, W. & A.			=	I winn Time	
Horsfieldii, Miq.		•		muniformia Davla	
hypoleuca, Miq.				making steeling of miles	
macrophylla, Grah. "108 marginata, Grah. "243 monadelpha, Grah. "243 oblonga, Grah. "106 oblonga, Wall. "246 obovata, Wall. "247 palustris, Grah. "106 paniculata, Grah. "106 racemosa, Grah. "105 racemosa, Grah. "106 racemosa, Grah. "107 rijida, Wall. "107 rijida, Wall. "108 reticulata, Lindl. "786 Portulaca, Linn. "106 sinuata, Wall. "104 decumbens, Vahl ii. 661 foliosa, Ker i. 1247 reticulata, Lindl. "786 rotederia delatata, Andr. "105 racemosa, Ham. "106 paniculata, Roxb. "106 racemosa, Grah. "107 rijihylla, Wight "104 uliginosa, DC. "105 rijihylla, Wight "105 racemosa, Grah. "106 racemosa, Grah. "105 racemosa, Grab. "105 racemosa, Dalz. dibs. "1223 racemosa, Dalz. dibs. "				aumusalama Tamad	
marginata, Grah				1 ' ' ' '	
monadelpha, Grah				grandiflore Wall	
oblonga, Grah				malaharina Clauka	
oblonga, Wall				iordoto Doub	
obovata, Wall , 243 ovalifolia, W. & A , 247 palustris, Grah , 106 paniculata, Grah , 106 pendulata, Grah , 105 pendula, Grah , 105 reflexa, Grah , 104 religiosa. Wight , 245 resca, Grah , 194 resca, Grah , 195 resca, Grah , 194 resca, Grah , 195 resca, Grah , 194 r	oblonga, Wall	,.		Toomoon Port	
ovalifolia, W. & A , 247 palustris, Grah , 106 paniculata, Grah , 106 pendulata, Wight , 245 pendula, Grah , 105 pendula, Grah , 105 reflexa, Grah , 105 reflexa, Grah , 245 reflexa, Grah , 246 reflexa, Grah , 247 reflexa, Grah , 247 reflexa, Grah , 246 reflexa, Grah , 247 reflexa, Grah , 246 reflexa, Grah , 247 retriculata, Royle , 24	obovata Wall.	•			
palustris, Grah.				speciosa. Benth	
paniculata, Grah			106	l amagtabilia Versa	221
pamiculata, Wight			106		221
Pendula, Grah.			245	two note Kure	223
racemosa, Grah.			105	wolnbilia Dunm	222
religiosa. Wight		,,			223
rigida, Wall. " 194 rosea, Grah. " 194 secunda. Grah. " 247 sericea, Vent. " 104 sinuata, Wall. " 246 tetraptera, Ht. Calc. " 106 triphylla, Wight " 241 uliginosa, DC. " 241 volubilis, Zoll. & Mor. " 243 sp., Wall. " 246 Pongatium indicum, Lamk. iii. 438 Pontederia dilatata, Andr. vi. 363 plantaginea, Roxb. " 363 racemosa, Ham. " 363 sagittifolia, Heyne " 363 sagittifolia, Heyne " 363 sagittifolia, Heyne " 363 vaginalis, Linn. " 363 Pontederia, Linn. " 363 sagittifolia, Heyne " 363 sagittifolia, Heyne " 363 sagittifolia, Heyne " 363 roteracespsifolia, Miq. ii. 439 Popowia, Endl. " 168 Beddomeana, Hk. f. & T. " 68 Beddomeana, Hk. f. & T. " 68 Beddomeana, Hk. f. & T. " 68 Beddomeana, Ming. " 69 Helferi, Hk. f. & T. " 69 nervifolia, Maing. " 69 nutans, Roxb. " 110 nervifolia, Maing. " 69 nutans, Roxb. " 110 nutans, Roxb. " 110 nutans, Roxb. " 110	reflexa, Grah	,,			
Portulaca, Linn.		,,			
Secunda Grah	rigida, Wall	,,			
Sericea, Vent.	rosea, Grah	,,			
Sinuata, Wall		,,			
tetraptera, Ht. Calc. ", 106 triphylla, Wight ", 241 uliginosa, DC. ", 241 volubilis, Zoll. & Mor. ", 243 sp., Wall. ", 246 Pongatium indicum, Lamk. iii. 438 Pontederia dilutata, Audr. vi. 363 hastata, Linn. ", 362 plantaginea, Roxb. ", 363 racemosa, Ham. ", 363 sagittifolia, Heyne ", 363 Pontederia dilutata ", 363 sagittifolia, Heyne ", 363 sagittifolia, Roxb. ", 363 Pontederia dilutata, Audr. vi. 364 Postida arrulata, Spreng vi. 570 Postida cereopsifolia, Miq. ii. 439 Popowia, Endl. ", 68 Beddomeana, Hk. f. & T. ", 68 Beddomeana, Hk. f. & T. ", 69 Helferi, Hk. f. & T. ", 69 Helferi, Hk. f. & T. ", 69 nervifolia, Maing. ", 69 nutans, Roxb. ", 110 nutans, Roxb. ", 110 nutans, Roxb. ", 110		,,			
triphylla, Wight		•• ,,			
uliginosa, DC. "				7 17	
volubilis, Zoll. & Mor. " 243 sp., Wall. " 246 Pongatium indicum, Lamk. iii. 438 Pontederia dilatata, Andr. vi. 363 hastata, Linn. " 362 pauciflora, Bl. " 363 plantaginea, Roxb. " 363 racemosa, Ham. " 363 sagittata, Roxb. " 363 sagittifolia, Heyne " 363 vaginalis, Linn. " 363 Pontederia Aleyne vi. 362 Posidonia serrulata, Spreng. vi. 247 Wightiana, Wall. " 247 Wightiana, Wall. " 247 Posidonia serrulata, Spreng. vi. 570 Posoqueria dumetorum, Roxb. ii. 10 fosciulata, Roxb. " 109 foribunda, Roxb. " 110 fragrans, Koen. " 111 longifora, Roxb. " 111 longispina, Roxb. " 110 nutans, Roxb. " 110 nutans, Roxb. " 110		,,		, , , , , , , , , , , , , , , , , , , ,	
sp., Wall. "246 Pongatium indicum, Lamk. iii. 438 Pontederia dilutata, Audr. vi. 363 hastata, Linn. "362 pauciflora, Bl. "363 plantaginea, Roxb. "363 racemosa, Ham. "363 sagittata, Roxb. "363 sagittofolia, Heyne "363 vaginalis, Linn. "363 PONTEDERIACEE vi. 362 Pootia cereopsifolia, Miq. ii. 439 Popowia, Endl. ii. 68 Beddomeana, Hk. f. § T. "69 Helferi, Hk. j. § T. "69 Helferi, Hk. j. § T. "69 nervifolia, Maing. "69 nutans, Roxb. "110 nutans, Roxb. "110 nutans, Roxb. "110 nutans, Roxb. "110					
Pongatium indicum, Lamk		"		olovocon Tinn	
Pontederia dilatata, Andr. vi. 363 hastata, Linn. 362 pauciflora, Bl.		;;;		mileen Hh Madw	
hastata, Linn.				anadnisda Lina	
paucifora, Bl. ", 363 plantaginea, Roxb. ", 363 racemosa, Ham. ", 363 sagittata, Roxb. ", 363 sagittifolia, Heyne ", 363 vaginalis, Linn. ", 363 Pontederiace. vi. 362 Pontederiace. vi. 362 Popowia, Endl. ", 108 Beddomeana, Hk. f. f. f. T. ", 68 factida, Maing. ", 69 Helferi, Hk. f. f. T. ", 69 nervifolia, Maing. ", 69 nutans, Roxb. ", 110				and which	
plantaginea, Roxb		• • • • • • • • • • • • • • • • • • • •		enffertioned Three	
Tacemosa, Ham.		• • • • • • • • • • • • • • • • • • • •		triborosa Romb	
sagittata, Roxb. ", 363 sagittifolia, Heyne ", 363 sagittifolia, Heyne ", 363 Posidonia serrulata, Spreng. vi. 570 Pontedeblace vi. 362 Pootia cereopsifolia, Miq. ii. 439 Popowia, Endl. i. 68 Beddomeana, Hk. f. f. T. ", 68 fætida, Maing. ", 69 Helferi, Hk. f. T. ", 69 nervifolia, Maing. ", 69 nutans, Roxb. ", 110	racemosa. Ham	•••		Wightiana Wall	
sagittifolia, Heyne ", 363 Posidonia serrulata, Spreng. vi. 570 vaginalis, Linn. ", 363 serrulata, Thw. ", 570 Pontederia, Maig. vi. 362 Posoqueria dumetorum, Roxb. iii. 110 Popowia, Endl. i. 68 fasciculata, Roxb. ", 109 Popowia, Endl. ", 68 foribunda, Roxb. ", 110 Beddomeana, Hk. f. f. T. ", 69 forgifora, Roxb. ", 111 Helferi, Hk. f. f. T. ", 69 longifora, Roxb. ", 110 nervifolia, Maing. ", 69 nutans, Roxb. ", 110 nutans, Roxb. ", 110 nutans, Roxb. ", 110				Dan	
vaginalis, Linn. ,, 363 PONTEDERIACE E. vi. 362 Posoqueria dumetorum, Roxb. iii. 110 Posoqueria dumetorum, Roxb. iii. 110 Popowia, Endl. i. 68 Beddomeana, Hk. f. f. T. 68 Helferi, Hk. j. f. T. 69 Helferi, Hk. j. f. T. 69 nervifolia, Maing. 69 nervifolia, Maing. 69			363		570
PONTEDERIACE E. vi. 362 Posoqueria dumetorum, Roxb. iii. 110 Popowia, Endl. i. 68 Beddomeana, Hk. f. § T. , 68 fragrans, Koen. , 110 Beddomeana, Hk. f. § T. 69 longiflora, Roxb. , 111 Helferi, Hk. j. § T. 69 longiflora, Roxb. , 111 nervifolia, Maing. 69 nutans, Roxb. , 110 resid. Well , 110			363	serrulata, Thw	570
Pootia cerenpsifolia, Miq. ii. 439 fasciculata, Roxb.			362		110
Popowia, Endl. i. 68 foribunda, Roxb. , 110 Beddomeana, Hk. f. & T. , 69 fragrans, Koen. , 111 fœtida, Maing. , 69 longiflora, Roxb. , 111 nervifolia, Maing. , 69 nutans, Roxb. , 110 nervifolia, Maing. , , , , , , </td <td></td> <td>• • •</td> <td>439</td> <td>fasciculata, Roxb ,,</td> <td>109</td>		• • •	439	fasciculata, Roxb ,,	109
Beddomeana, Hk. f. & T. , 68 fragrans, Koen. , 111 fœtida, Maing. , 69 longiflora, Roxb. , 111 Helferi, Hk. f. & T. , 69 longispina, Roxb. , 110 nervifolia, Maing. , 69 nutans, Roxb. , 110 nutans, Wall , 110	Popowia, Endl			floribunda, Roxb ,,	
fætida, Maing ,, 69 longiflora, Roxb ,, 111 Helferi, Hk. j. & T ,, 69 longiflora, Roxb ,, 110 nervifolia, Maing ,, 69 nutans, Roxb ,, 110 nutans, Roxb ,, 110		r. "		fragrans, Koen ,,	
Helferi, Hk. j. & T, 69 longispina, Roxb, 110 nervifolia, Maing, 69 nutans, Roxb , 110	foetida, Maing				
	Helferi, Hk. j. & T.	. ,,	7.7.4	longispina, Roxb ,, !	
		,,		nutans, Roxb ,,	
		,,	69	rigida, Wall ,,	109

				•		•
Posoqueria	Vol.	Page	Potentilla		Vol.	Page
uliginosa, Roxb	iii.		cataclines, Lehm			357
Potamochloa Retzii, Griff	vii		Cautleyana, Royle			357
Potamogeton, Linn		565	cicutariæfolia, Willd.	•••	,11	359
manufatus D D		566		• • • •	,	
onlanus Tinu	"		cinerascens, Bertol	• • • •	"	354
crispus, Linn	"	566	Clarkei, Ilk. f	• • •	,,	351
digynus, Wall	"	566	coccinea, Hoffm	•••	,,	355
elegans, Wall	,,	566	colorata, Lehm		,,	355
flabellatus, Bab	"	56 7	commutata, Lehm	• • •	,,	35 3
flabellatus, Hk. f	"	567	coriandrifolia, D. Don			353
heterophyllus, Ham		566	cryptantha, Klotz		"	358
22	"	566	A. 327 10	•••	"	348
indiana Dank	"	565		•••	"	
indiana Dath	"		cuncifolia, Bertol	•••	"	348
indicus, Roth	"	564	curviseta, Hk. f	•••	,,	358
javanicus, Hassk	"	566	denticulata, Ser	•••	,,	359
lucens, Linn	"	567	denticulosa, Ser	:	,,	343
lucens, Ham	,,	567	desertorum, Bunge	·	,,	355
malaianus, Miq	,,	567	discolor, Bunge	•••	,,	351
marinus? Ham	,,	567	discolor, Camb	•••		348
muoronatus, Presl		567	doubjouneana, Camb.		"	357
Timi	"	565	Durandii, Torr. & Gr.	•••	"	343
4	"	565		• • • •	"	
natans, Thw	"		eriocarpa, Wall	•••	"	348
oblongus, Viv	"	566	formosa, D. Don	•••	"	355
parvifolius, Buob	"	566	fragariæfolia, Klotz.	•••	"	343
pectinatus, Linn	"	567	fragarioides, Linn	•••	,,	350
perfoliatus, Linn	"	56 6	fragiformis, Willd		,,	357
polygonifolius, Pourr	"	566	fruticosa. Linn		"	347
pusillus, Linn	"	5 67	fulgens, Wall			349
Roxburghianus, Schult. f.		565	golida, C. A. Meyer		"	357
*	"	565		•••	"	350
According to March	"		Gerardiana, Wall	•••	"	
tenuicaulis, F. Muell	"	566 566	glauca, Camb	•••	"	353
tuberosus, Roxb	"	566	gracilis, Wall	•••	"	359
Potentilla, Linn	ii.	345	Grahamiana, Wight	•••	,,	350
adnata, Wall	"	343	grandijlora, Hk. f. & T.		,,	357
alba, Linn	,,	358	Griffithii, Hk. f		,,	351
albifolia, Wall	,,	347	Gul. Waldmeri, Klotz.		"	355
alpestris, Hk. f. & T	"	357	Heynii, Roth		,,	359
altaica, Bunge		354	hirla, Linn			356
11 0 1	"	348		•••	"	354
	"			•••	"	348
amurensis, Maxim	"	359	Inglisii, Royle	• • • •	"	
anserina, Linn	"	350	insignis, Royle	•••	17	357
Arbuscula, D. Don	"	347	Jacquemontiana, Camb.	•••	"	357
argentea, Linn	,,	356	kashmirica, Hk . f		,,	355
argyrophylla, Wall	"	356	Kleinians, W. & A		,,	359
argyrophylla, Wall	"	357	Kotschyana, Fenzl		,,	355
Atropos, Hoffm	"	360	Leschenaultiana, Ser.		"	350
atrosanguinea, Lodd		357	leucochroa, Lindl		"	357
:11:4 111. A	"	346	leuconota, D. Don			352
	"	350		•••	"	351
bannehalensis, Camb	"		leuconota, Wall	•••	"	
barbata, Wall	"	349	Lindenbergii, Lehm.	•••	"	348
bidens, Bertol	"	353	lineata, Trevir	• • •	"	349
biflora, Willd	"	348	meifolia, Wall	•••	"	353
bifurca, Linn	"	353	microphylla, D. Don		,,	352
bifurcata, Wall	,,	355	microphylla, Royle		"	353
breviscissa, Bertol		354	microphylla, Wall		,,	352
	"	358	monanthes, Lindl			358
7 '	"	359		•••	"	849
cana, Wall	"	360	Mooniana, Wight	•••	"	358
Candolleana, Royle	"	300	Moorcroftii, Wall	•••	••	000

Potentilla	Val	Page	Pothos		Val.	Page
multisida, Linn		858	Barberianus, Schott			558
Munroana, Lehm		850	bifarius, Wall		"	555
Naspata, Ham		349	Cathcarti, Schott		, ,,	552
"1 17 1		355	caudatus, Roxb	•••	;,	549
		858	cognatus, Schott			552
nives, Linn	•••	359	Cartisii, Hk. f		"	5.4
obovata, Bertel		847	decipiens, Schott		"	552.
ochreata, Lindl	• • • • • • • • • • • • • • • • • • • •	351	l 1 - '11		5 47	549
peduncularis, D. Don		854	1 1 1 2		νi.	547
pennsylvanica, Linn		346	decursiva, KOXD	•••		549
perpusilla, Hk . f		349	decursiva, Wall elegans, Wall	•••	"	540
polyphylla, Wall	•	354		•••	"	555
polyschista, Boise		345	elliptica, Moon	•••	,,	552
procumbens, Clairy	"		exiguiflorus, Schott	•••	99	552
Pseudo-ansering, Bertol.	"	350	fallax, Schott	• •	"	548
pteropoda, Royle	"	356	giganteus, Rozb	•••	"	
pteropoda, Hoffm	"	360	glaucus, Wall	•••	"	547
purpures, Hk. f	,,	347	gracilis, Schott	•••	99 .	553
reptans, Linn	,,	356	heterophyllus, Roxb.	•••	"	550
reticulata, Bertol	"	347	Hookeri, Schott	•••	,,	552
rigida, Wall	,,	347	Junghuhnianus, de Vrie	80	"	553
ruthenia? Hb. Ham	,,	359	Kingii, Hk. f	•••	,,	553
Saxifraga, Ard	"	358	Kunstleri, Hk.f	•••	"	554
Salessovii, Steph	"	348	laucifolius, Hk. f	•••	,,	554
Saundersiana, Royle	,,	354	Lasia, Roxb	•••	,,	550
serio-a, Linn	"	354	latifolius, Hk. f		,,	554
Sibbaldi, Haller, f	"	345	macrocephalus, Scort.	•••	"	553
Sibbaldia, Griess	"	346	macrophyllus, de Vriese		"	553
Siemersiana, Lehm		849	35 . " 777 4	•••	,,	554
. 15	"	354		•••	"	540
777 771	"	849	377-11	•••	"	540
	,,	349	. 1.7/	•••		555
	"	859		•••	"	541
supine, Linn tenella, Turoz	"	354	AP - 11 THE 17	•••	"	547
	"	346	70 1 . Th' 1	•••	"	545
tetrandra, Hk. f	"	358	77 777 11		"	546
tridentata, Linn	"	343		•••	"	547
trifida, Lehm	"	345		•••	"	549
trullifolia, Hk. f	"	350	To 1	•••	••	540
variabilis, Klotz	"				":	
velutina, Wall	"	351	remotiflorus, Hook ▼.			552
verticillaris, Steph	"	354	The manufact of the sale		vi.	
vestita, Klotz	"	357		•••	"	552 551
Wallichiana, Govau	15	357		•••	"	
Wallichi ina, Ser	"	343		•••	"	532
Wallichiana, Wall	"	359		•••	"	552
sp., Clarke	"	860		•••	"	552
sp., Hk. f. & T	,))	351		•••	"	550
POTENTILLEE	ii.	807		•••	"	553
POTERIEA	ii.	308		•••	,,	555
Poterium, Linn	ii.	362		•••	••	543
diandrum, Hk. f	"	862		•••	"	552
filiforme, Hk. f	,,	862		•••	•••	553
indioum, Gardn	"	862				652
longifolium, Hk. f	"	368	cantonensis, Hook. & Ar	n.		652
Sanguisorba, Linn	,,	363	Hookeriana, Wight	•••	19	652
Pothomorphe subpeltata, Miq.	v.	95	4 A TOCI -	•••	,,	652
Pothos, Linn	vi.	551	Poupartia mangifera, Bl.	•••	ij.	48
angustifolius, Presl	**	552 l	pinnata, Blanco	•••	"	48

		Vol.	Page	Pouzolzia		Vol.	Page
Pourthisss, Done		ii.	382	quinquenervis, Benth.		٧.	586
arguta, Done		"	382	ramosissima, Wight		,,	583
Hookeri, Done		71	382	Rheedii, Wight		,,	582
salicifolia, Done		,,	382	rostiata, Wight		"	582
Pouzolzia, Gaud		٧.	580	R thiona, Bi		"	588
acuta, Wight	•••	"	584	rotundifolia, Wight	•••	"	582
alienata, Gaud	•••	"	581	scabra, Wight	•••	,,.	584
ambigua, Wight	• • •	"	584	scalrida, Wight	•••	"	582
angustifolia, Wight	•••	"	581	Sonneratii, Gaud	•••	"	580
aspera, Wight	•••	"	584	sponiæfolia, Schlecht.	•••	"	585
auriculata, Wight	•••	17	582	Stocksii, Wight	•••	"	583
Bennettians, Wight	•••	"	585	suffruticosa, Wight	•••	"	581 581
bicuspidata, Wight	•••	"	582 581	tenuis, Bl	• • •	"	584
borbonica, Wight bracteata, Benn	•••	"	585	ternata, Benn tetraptera, Wight	•••	"	581
	•••	"	585	tetraptera, Wight tomentosa, Wight	•••	"	586
caudata, Benn concinna, Wight	•••	"	584	trialata, Wight	•••	"	584
andmin D1	•••	"	587	triandra, Bl	•••	"	587
courtallensis, Wight	•••	"	585	trichophora, Hohen.		"	581
cymosa, Wight	•••	"	582	tuberosa, Wight	••	"	582
Dalzellii, Wight		"	583	vesicaria, Wight		"	582
diffusa, Wight		"	582	viminea, Wedd		"	581
elliptica, Wight		"	582	Walkeriana, Wight		"	583
Gardneri, Bl		"	586	Wallichiana, Wight		"	584
Gardneri, Wight	•••	"	586	Wightii, Benn		"	584
glomerata, Hassk		"	581	zeylanica, Benn		,,	581
heterocarpa, Wight	•••	"	585	Praines, King		v.	516
heterophylla, Bl		"	581	scandens, King		"	547
hirta, Hassk		"	584	Prangos, Lindl	• • •	11.	695
hispida. Benn		"	586	pabularia, Lindl		,,,	695
Huegeliana, Bl		"	585	Prasire	• • •	iv.	607
indica, Gaud		,,	581	Prasium melissifolium, Re	υ χ υ.	iv.	698
integrifolia, Dalz	• • •	,,	587	Pratis, Gaud	• • •	ili.	422
integrifolia, Dalz	•••	,,	583	begonifolia, Lindl	•••	"	422
Johnsoniana, Wight	•••	"	581	montana, Hassk	•••	"	423
longifolia, Wight	•••	"	584	Nummularia, Kuiz	• • •	"	422 425
microphylla, Wight	•••	".	582	radicars, G. Don	•••	"	425
minor, Wight	v.			Thunhergii, G. Don	•••	"	422
mysorensis, Wight	•••	▼.	586	zeylanica, Hassk	•••	iv.	571
neiljhirensis, Wight	•••	"	584 584	Premna, Linn amplectens, Wall	•••		580
oblongifolia, Wight	•••	"	586	angustata, Wall	•••	"	580
ohscura, Bl orientalis, Wedd	•••	"	588	arborea, Roth		"	581
	•••	"	586	barbata, Wall		"	579
11 161-	•••	"	581	bengalensis, Clarke		"	577
	•••	"	584	bracteata, Wall		"	572
parva, Bl	•••	"	581	cana, Wall	•••	"	579
parvitolia, Wight		"	587	ceramensis, Miq		"	575
pauciflora, A. Rich.	•••	"	593	cordifolia, Roxb	•••	"	572
pentandra, Benn		"	583	cordifulia, Brancis		"	574
pentandra, Roxb		"	583	cordifolia, Grah		"	578
pilosa, Wight	•••	"	581	cordifolia, Wall	•••	"	572
procumbens, Wight		"	581	cordifolia, Wight	•••	"	573
propinqua, Bl		,,	582	coriacea, Clarke	•••	"	573
pyramidata, Wight	•••	"	581	corymbosa, Rottl. &			
quadrialata, Wight	٧.	585,	586	Willd	•••	,,	573
quinquenervis, Bonn.	•••	V.	586	densiflora, Wall	•••	,,	573
- -							

Premna	V	ol. Page	Premna		Vol. Page
divaricata, Wall		v. 575	villosa, Clarke		· PHO
esculenta, Rozb		,, 580	Wightians, Schau.		E Pro
flavescens, Ham		,, 578	Wightiana, Bedd.	•••	" 570
flavescens, Juss		,, 576	sp. Hk. f. & T.		575, 576,
grossa, Wall !		" KR1	S 02. 112. 1. 02.		578, 579
herbaces, Roxb		″ go1	? sp. Wall	-	
2-A		577	Prenanthes, Linn.	•••	3** 411
7A		. 57A	1 1 1	•••	904
7 A A TTT 11		270		•••	″ 410
laborione Oleula		" E7=	alata, Hk. f. & T.	•••	"
khasiana, Clarke		, 575	alata, Hk. f.	•••	,, 412
latifolia, Roxb		74, 577	alliariæfolia, DC.	, <u>i</u>	,, 412
latifolia, Thw latifolia, Wight	•••	, 576	aspleniifolia, Willo		,, 415
tatijona, wight	•••	, 578	Brunoniana, Wall	• • • • • • • • • • • • • • • • • • • •	,, 411
longifolia, Roxb	••• ;	, 575	Brunoniana, DO.		,, 412
longifolia, Wall.	1	, 577	? Candolleana, Wa	II. iii.	388, 397
lucidula, Kurz	•• ;	, 575	dichotoma, Wall.	"	415, 416
macrophylla, Wall	,	, 580	diversifolia, Ledeb	•	iii. 89 5
micrantha, Schau		, 578	glabra, Heyne		,, 396
micrantha, Thw		, 579	glomerata, Done.		,, 398
milleflora, Clarke		, 576	graciliflora, Wall.	•••	,, 406
mollissima, Roth		, 578	hispidula, DC	•••	,, 412
mucronata, Roxb	,	570	Hookeri, Clarke	•••	,, 412
ovalifolia, Wall	,	5/7A	japonice, Linn	•••	,, 395
parasitica, Bl	••• ,	. È74	khasiana, Clarke		" 411
Perrottetii, Clarke		, K79	lævigata, Bl		411
pinguis, Clarke		57Q	lævigata, Wall		" 408
procumbens, Moon		590	napifolia, Wall.		" 20E
mark assess a Di	,	577	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		., 416
. 1 . 01 1	,	ETE		***	403, 416
3 11	,	. 577	70 1 999 11		iii. 395
•	,	57.1	·	•••	416
purpurascens, Thw.	,		procumbens, Roxb.	,	,, 416
pygmæa, Wall	,		P quinqueloba, Wal		" 35 4
pyramidata, Wall	,		racemosa, Roxb.	•••	,, 403
racemosa, Wall	,		raphanifolia, DC.	•••	,, 412
racemosa, Gamble	,		rigida, Ham	•••	,, 396
ramosa, Wall	,		rostrata, Bl	•••	,, 406
Roxburghiana, Wall.	,		sarmentosa, Wall.	•••	,, 336
sambucina, Wall	,		sarmentosa, Willd.	<u></u>	,, 417
scandens, Rosb	,		scandens, Hk. f. &	T	,, 413
scandens, Brandis	,		sikkimonsis, Hk. f.	•••	,, 412
scandens, Dalz. & Gibs.	2	, 573	sonchifolia, Heyne	•••	,, 403
scandens, Wall	iv. 57	3, 578	squarrosa, Thunb.	•••	,, 403
serratifolia, Linn	i	v. 574	striata, Bl	•••	" 3 95
spinosa, Roxb	,		taravacoides, Wall.		,, 4/03
subcordata, Turez	91	574	violæfolia, Dene.		,, 412
thyrsiflora, Heyne	,	578	<i>èp</i> . Griff		,, 396
thyrsoidea, Wight	٠, ,,	579	Preptanthe vestita, I	Rebb. f.	v. 852
Thwaitesii, Clarke	,,	570	Primula, Linn	iii.	492, 672
tomentosa, Willd	iv. 13		altissima, D. Don		iii. 484
tomentosa, Bl	iv		bellidifolia, King	•••	,, 486
tomentosa, Kurz	,,	576	capitata, Hook		" 486
tomentosa, Miq	••• ,,	501	cachemiriana, Muni		,, 486
tomentosa, Roxb	,,	570	Clarkei, Watt		" 494
trichostoma, Miq	,,	EME	concinna, Watt		407
truncata, Turoz	•••	579	cortusoides, Linn.		" 40E
viburnoides, Kurz	,,	578	denticulata, Sm.		" 40E
viburnoides, Wall	iv. 57		denticulata, Wight		″ 400
· · · · · · · · · · · · · · · · · · ·	01	-, 0.0 (mountainment, 14 yBits	•••	,, 400

Primula		T - 1	n	Primale		
Th. 1			Page 491	Primula Stuartii, Wall		l. Page i. 490
7 70 1			489	A 11- 12:		409
Elwesiana, King	•••	"	492	1 4:5-4: 117-44	••• ,	188
elliptica, Royle	•••	"	488	I And Janaaria D. D		403
elongata, Watt		"	490		-	409
erosa, Wall		"	486	1	··· ,	101
farinoss, Linn		"	486		··· ,	405
tilipes, Watt		"	485	VIF. AASS ITS		670
floribunda, Wall		"	495	1 (1/ar		485
Gambeliana, Watt		"	483	PRIMULACEE	i	ii. 482
geraniifolia, Hk. f	•••	"	484	Primulræ	i	ii. 482
glabra, Klatt	•••	"	487	Prinos cymosa, Hassk	i	
globifera, Griff		"	486		,	, 598
Heydei, Watt		"	487		i	i. 322
Hoffmeisteri, Klotz	•••	,,	485		,	
Hookeri, Watt	•••	"	494	Prionachne Ecklonii, No		
humilis, Stend	•••	"	492		Vi	
imperialis, Jungh	•••	"	489		iv	
involucrata, Wall	•••	"	488		, ,	
Jaschkiana, Kern	•••	"	490	Prionostuchys ensifolia, Has.		
japonica, A. Grav	•••	"	489		,	
Kauffmanniana, Regel	•••	"	495 491		;	
Kingii, Watt	•••	"	485		• •	05
Listeri, King	•••	"	490		··· ,	, 100
macrophylla, D. Don	•••	"	487	Prismatocarpus littorali		615
mugellanica, Lebm	•••	"	494	T		ii. 159
minutissim», Jac į	•••	"	484	- 11-2-220 (n)		150
mollis, Hook Moorcroftiana, Wall.	•••	"	490		, ,	150
37	•••	"	488			v. 91
muscoides, Hk. f	•••	"	491	1		v. 565
nana, Wall	••	"	493		,,	EGE
obconica, Hance	•••	"	485	73	. ,	ECK
obovata, Wall		"	495	1 1 4	,	ECE
obtusifolia, Royle	•••	"	489	1		. 575
odontophylla, Wall		,,	483	D-2-	,	566
petiolaris, Wall		,,	493	1	,	569
poculiformis, Hk. f		"	485		,	
prolifera, Wall	•••	,,	489	diversifolia, Wall	,	572
pulchra, Watt		,,	483	elegans, Wall	v. 57	2, 573
purpurea, Royle		"	490		V	
pusilla, Wall	•••	,,	492		,,	
reptans, $Hk. f. \dots \dots$	•••	"	494		,	
reticulats, Wall	•••	,,	493		,,	
roses, Royle	•••	"	489		,,	
rotundifolia, Wal	•••	"	483	1 1 1 1 717	,	
sapphirips, Hk . f . X T .	•••	"	492		,	
Saundersiana, Royle	•••	"	494		,	
sessilis, Royle	•••	"	493		,,	ETO
sibirios, Jacq	•••	"	487	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,,	EPH
sikkimensis, Hk. f	•••	"	491 495	, , , , , , , , , , , , , , , , , , ,	•• ,,	771
simensis. Hochst	•••	"	493 493		, v 55	9, 569
soldanelloides, Wa't	•••	"	488			v. 564
spathulacea, Jacquem. speciosa, D. Don	•••	"	484	1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		644
0.1	•••	"	495	1	•• ,	564
	•••	"	494	punctata, Wall		4, 565
Stracheyi, Hk. f	•••	"	201	Providence, Warre	00	-, 000

Procris	Vol.	P-ge	Psammogeton	V ol.	Page
racemosa, Royle	v.	555	biternatum, $Edgew$	ii.	719
rupestris, Ham	,,	564	brevisetum, Boiss	,,	720
sesquifolia, Reinw	,,	564		,,	719
sessilis, Hook. & Arn	"	563	setifolium, Boiss	,,	720
Wightiana, Wall	"	575	Pseudanthistiris, Hk. f. vi		421
Prosopis, Linn	iï.	287			220
spicata, Burm	,,	288	3 4 -3% 117. 6	,,	219
spicigera, Linn	"	288	1 1 1 1 771 4	,,	219
Stephaniana, Kunth	"	288	11-4- 771- A	,,	220
Prosorus cyanosperma, Thw.	ű.	305	I seudanthus brachiatus,	"	
Gaertneri, Thw	,, -	805		iv.	726
indica, Dalz	,,	305	T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ii.	153
indica, Thw	"	305		,,	171
PROTEACE	٧.	189		,,	174
Protium. W. & A	i.	530	polycarpa, Hassk	,,	175
caudatum, W. & A	,,	530	777 6. 4	. "	154
gileadense. W. & A	"	530	Pseudehretia umbellata, Turc	3Z 1.	604
pubescens, W. & A	"	530	Pseudicora? auriculata, Mic	1. i.i.	108
Roxburghiana, W. & A	"	530		- :• »	111
PRUNER	iï.	307		. ,,	94
Prunella, Linn	iv.	670	Zollingeriana, Miq	•••	111
indica, Burm	"	611	Pseudobarleria carulea, Oors		489
Prunus, Linn	íi.	312	polytricha, Oerst		490
acuminata, Hk. f	,,	317	Pseudoraphis Brunoniana,	"	
adenophylla, Wall	"	316		vii.	62
Aloochao, Royle	"	315		vii.	94
Amygdalus, Baill	"	313		iv.	246
armeniaca, Linn	"	313		vii.	
Avium, Linn	"	313	110 77	. ,,	409
bokhariensis, Royle	"	315	77 16 . 72	,,	411
caproniana, DC	"	313		•• ",	409
cerasoides, D. Don	"	314	T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ÿ.	487
Cerasus, Linn	,,	313	Jan Allan Danner	,,	487
communie, Huds	"	315	Pseuduvaria reticulata, Mic	q. i.	77
ferruzinea, Wall	,,	314		. ii.	
humilis, Bunge	"	314	Onnor Time	,,	468
insititia. Linn	"	315		. ,,	468
Jacquemontii, $Hk.f.$	"	314	mamilanum Timm	,,	468
javanica, Miq	"	316	Psilæa dalbergioides, Miq	Ÿ.	198
Jenkinsii, Hk. f. & T	,,	317	Psilobium capillare, Kurz .		121
Junghuhniana, Miq	"	317	Psilopogon Figarei, De Not.		147
Mahaleb, Linn	"	312	1 0.12° To 1	,,	147
martabanica, Kurz	"	316		iv.	
nepalensis, Koch	"	316	1 TTT A	,,	726
Padus, Linn persica, Benth. & Hk. f	"	315		víí.	104
persica, Benth. & Hk. f	"	31,3	filiformis, Dalz. & Give	,,	10±
prostrata, Labill	"	313	77 1	,,	104
Paddum, Roxb	"	314			724
punctata, Hk. f. & T	"	317		,,	725
rufa, Steud	"	314		,,	725
sylvatica, Roxb	"	814	nudum, Moq	. ,,	724
tomentosa, Thunb	"	314	777 7	,,	725
trichocarpa, Bange	"	314	sceleranthum, Thw	"	725
triflora, Roxb	"	315	l sandaram Dala	. ,,	726
undulata, Ham	"	316	trichotomum, Bl	,,	725
Psammanthe marina, Hance	ii.	659	Psophocarpus, Neck	. ii.	211
Psammogeton, Edgew	ji.	719	longepedunculatus, Hass	k. "	212

- .			. —	•		
Psophocarpus		Page	Psychotria_			Page
palmettorum, Guill. & Perr.	ii.	212	Moonii, Hk. f		iii.	170
palustris, Desv	"	212	morindæflora, Wall.	•••	"	166
tetragonolobus, DC	,,	211	nervosa, D. Don		. ,,	175
Psorales, Linn	ii.	103	nicobarica, Kurz	•••	,,	172
corylifolia, Linn	11	103	• nudiflors, W. & A		"	175
plicata, Delile	•••	108	obesa, Wall		iŸ.	92
tetragonoloba, Linn	"	92	obovata, Wall			166
The second secon	iii.	161	ophinxyloides, Wall		iıi.	176
1 11 707 . 17		164	1 727 77			166
	"	176	ovoides, wall ii	i. 17	a"; .	
ambigua, W. & A	. ,,	176	manager and a Direct of		??:*	175
ampla, Wall	"		penangensis, Hk. f		iii.	164
anamallayana, Bedd	"	171	pendula, Hk. f	•••	"	
andamanios, Kurz	"	168	picta, Wall	•••	"	173
angulata, Korth	"	172	platyneura, Kurz	•••	17	164
asiatica, Linn	"	176	plurivenia, Thw	•••	77	170
usiatica, Wall aurantiaca, Wall bisulcata, W. & A bracteata, W. & A	"	173	polycarpa, Hk. f	•••	"	165
aurantiaca, Wall	,,	165	polyneura, DC	•••	"	174
bisulcata, W. & A	,,	171	polyneura, Kurz	•••	,,	175
bracteata, W. & A	,,	163	Reevesii, Wall		,,	168
Brownii, Spreng	,,	176	rostrata, Bl		"	177
oalocarpa, Kurz	,,	173	sarmentosa, Bl		"	165
? Chloranthus, Ham		174	scandens, Moon		"	165
TTT 0. A	"	162	silhetensis, Hk. f			174
	"	171	sordida, Thw		"	170
	"	164	sphærocarpa, Wall		"	176
connata, Kurs	"	176	1 7 77 6	•••	"	161
curviflora, Wall	"			•••	"	167
Dalsellii, Hk. f	"	163	stipulaces, Wall	•••	"	168
denticula a. Wall	"	173	sulcata, Wall	•••	"	
divergens, Kurz	,,	168	subintegra, Hk. f	•••	"	162
Dodda-Jervam, Schlecht.	,,	171	symplocifolia, Kurz	•••	"	172
elliptica, Ker	19	168	tabacifolia, Wall	•••	**	174
elongata, Hk. f	,,	163	tetrandra, Bl	• • •	,,	176
Pelongata, Bedd	,,	163	Thomsoni, Hk. f	•••	"	173
erratica, Hk . f	"	168	Thwaitesii, Hk. f	•••	"	162
expansa, Bl	,,	165	tortilis, Bl		,,	169
filipes, $Hk. f.$,,	170	truncats, Wall	•••	,,	163
fulva, Ham	"	169	tylophora, Kurz		,,	164
fulva, Wall		174	vaginans, Hk. f		••	176
~ · · · · · · · · ·	"	161	? vaginans, DC. ii	i. 170	6."iv	. 91
	**	161	viminea, Wall	•••	iv.	91
	"	177	viridiflora, Reinw	•••	iii.	173
Griffithii, Hk. f	"	172	viridissima, Kurz			174
Helferiana, Kurz	"	178			**	175
herbacea, Linn	100			•••	"	167
			Wightians, Ilk. f	172,	179	
Jackii, Hk. f	iii.	167		112,	170,	100
Johnsoni, Hk. f	,,	175	sp., Miq	٠ <u></u> ،	III.	166
lævigala, W. & A	"	171	sp., Miq sp., Wall. iii. 79, 81, 160, 163, 166, 167, 1	90, I	Un,	112,
longifolia, Dalz	"	177		υ ν , ι	7Z,	173,
longipeticlata, Thw	,,	170	174, 175, 176, 177, 19	2, 17	וא .'	, 92
lurida, Bl	"	176	PSYCHOTRIER		21,	
macrocarpa, Hk. f	,,	162	Peydrax dicoccos, Guertu.			
madraspatana, Hk. f	"	167	Ptelea viscosa, Linn	•••	i.	697
Maingayi, Hk. f	,,	166	Pteleocarpa, Oliv		i.	591
malayana, Jack	"	165	malaccensis, Oliv		"	591
microcarpa, Wall		169	PREMARTHER			712
	"	174	Pteridophyllum decipien			
montana, Bl	"	169	Thw	-, 	i.	539
monticola, Kurs	"	-00		•••		,

V ol. ¹	Page	Pterospermum	Vol.	Page
Pterilema acerifolium, Reinw. v.	596	rubigonosum, Heyne	i.	368
Pterisanthes, Bl i.	663	semisagittatum, Ham	,,	368
cissoides, $\acute{B}l$,,	664	suberifolium, Lamk	"	367
heterantha, Laws "	664	suberifolium, Willd	"	369
pedata, Laws ,,	664	Pterostelma acuminatum,	••	
polita, Miq ,,	663	Wight	iv.	53
Pterium elegans, Desv vii.	307	Pterostigma capitatum,		
Pternandra, Jack ii.	551	Benth	iv.	264
ammulasaana Task	551	macrophyllum, Benth	"	264
	551	ovatum, Benth	"	263
askingan Toole	552		"	264
anhimmen Wall	552	etwictum (triff	-	263
7 - A: 6 - 7: Music	551	subrepens, Thw	-	263
!1-4- D.: 41	551	villosum, Benth		263
	238	villosum, Thw	•••	264
	239		:::	398
bilobus, Roxb ,,	238			399
dalbergioides, Roxb,		bifida, Clarke	25	399
indicus, Willd ,,	238	Falconeri, Hk. f	"	
macrocarpus, Kurz ,,	239	Pterygodium sulcatum, Roxb.	V 1.	107
Marsupium, Rowb "	239	Pterygostachyum Lehmanni,		105
santalinus, Linn. f ,,	239		vii.	
Wallichii, W. & A ,,	238	Pterygota, Endl	Ĭ.	360
Pterocaulon, Elliott iii.	275	alata, Br	,,	360
Billardieri, F. Muell "	275	alata, Thw	**	361
cylindrostachyum, Clarke "	275	Roxburyhii, Schott. & Endl	,,	360
Pteroceras, Hasselt vi.	33	Ptilagrostis mongholica,		
Pterochilus plantagineus, Hook.		Griseb	vii.	230
& Arn v.	688	Ptilocnema bracteatum,		
Pterococcus glaberrimus,		D. Don	٧.	846
Hassk v.	464	Ptilonema plumosum, Steud.	vii.	284
Pterocyclus angelicoides,		Ptilotrichum canescens, C. A.		
Klotz ii.	703	36	i.	141
Pterocymbium, Br i.	362	elongatum, C. A. Mey.		
javanicum, Br ,,	362	(lapsu Pilotrichum)	,,	141
Pterolobium, R. Br ii.	259	Ptilotus ovatus, Mog		725
indicum, A. Rich ,,	259	Ptychopyxis, Miq		454
lacerans, Wall ii. 256,		costata, Miq		455
macropterum, Kurz ii.	259	Ptychoraphis, Becc	• • •	413
micromballam Mic	259	augusta, Becc		414
Pteroloma triquetrum, Benth. ii.	163			413
Pteropyrum, J. & S v.	23	Ptychosperma costata, Miq	"	409
Out Make Maken	23			408
Olimiani I & S	23			409
	366	1	• • •	410
	368	malaiana, Miq		411
acerifolium, Willd ,,	367	patula, Miq rupicola, Thw	• • • • • • • • • • • • • • • • • • • •	413
acerifolium, Zoll. & Moritz. "		1		413
aceroides, Wall ,,	368	singaporensis, Becc	,"	
canescens, Roxb ,,	367	Ptychotis achilleifolia, DC		684
diversifolium, Bl "	367	Ajowan, DC		682
glabrescens, $W. & A. \dots$,	369	anethifolia, DU		683
Heyneanum, Wall "	369	anethifolia, DO coptica, DC Roxburghiana, DC		682
Jackianum, Wall ,,	367	Roxburghiana, DO		682
lancessfolium, Roab ,,	368	sp., Hk. f. & T. ii. 681, 682,		
Lawianum, Nimmo ,,	369	sp., Wall Ptyssiglottis, T. Anders	,,,	682
oblongum, Wall ,,	367	Ptyssiglottis, T. Anders	iv.	
obtusifolium, Wight ,,	369	radicosa, T. Anders	"	544
reticulatum, W. & A,	369		ii.	197
• • •		•		

Pueraria	Vol	Page	1	Vol	Page
brachycarpa, Kurz	••	199	Pycnospora, R. Br		153
Candollei, Grah	"	197	hedysaroides, R. Br.		153
composita, Grah		198	1 337 E. A	•••	153
annmanita Wall	"	198	T		589
Administra IV	"	199			
	"	199	albomarginatms, Necs		594
	"		angulatus, Nees	* **	593
peduncularis, Grah	"	197	Baccha, Nees	,,	593
phaseoloides, Benth	"	199	capillaris, Necs diffusus, Necs	"	591
Stracheyi, Baker	"	198	diffusus, Nees	"	596
stricta, Kurz	"	198	ferrugineus, Clarke	,,,	593
subspicata, Benth	"	199	flavescens, Nees	"	589
Thomsoni, Benth	"	198	lævigatus, Nees	"	596
tubeross, DC	"	197	lateralis, Neos	,,	596
Wallichii, DC	,,	198	latospicatus, Clarke	"	590
Pulicaria, Gaertn	iii.	297	macranthus, Clarke		593
angustifolia, DC	,,	299	mucronatus, Nees		596
Boissieri, Hk. f	,,	300	nitens, Nees		591
Boissieri, Hk. f crispa, Benth	"	299	polystachyus, Beaur		592
dvsinterica. Gaertn	"	298	polystachyus, Beauv	"	609
foliolosa, DC	,,	298	pumilus, Necs		591
glaucescens, J. & S	"	300	puncticulatus, Necs vi.	593.	
gnaphalodes, Boiss	"	299	pygmæns, Nees	vi.	596
hyderabadensis, DC	"	298	sanguinolentus, Necs	"	590
7 . J		299	squarrosus, Nees		623
	"	300	1	"	589
	**	299		**	59 3
Q+121 117. A	"	300	ا تما	:"	318
	"	299		11.	318
Stocksii, Boiss	"	298	acuminatum, Coleb	"	319
vulgaris, Gaertn	"		acuminatum, Hk. f. & T.	11	321
Wightiana, Clarke	>>	298	Pacuminatum, Wight	"	
Punduana volkameriæfolia,		040	Andersoni, IIk. f	"	320
Steetz (lapsu Vernonia)	iii.	240	arboreum, Endl	**	322
vulgaris, Steetz (lapsu Ver-		0.40	arborcum, Endl	"	320
nonia)	."	240	brevifolium, IIk. f	"	321
Puneeria coagulans, Stocks	iv.	240	capitellatum, Hk. f	**	321
Punica, Linn	ii.	580	coylanioum, Gaertn	17	32L
Granatum, Linn	,,	581	ceylanicum, Bedd	"	319
nana, Linn Pupalia, Juss	,,,	581	Gardneri, Hk. f	"	821
	iv.	723	glaberrimum, Hk. f	17	319
atropurpurea, Moq	"	723	Griffithii, Hk. f Lampongo, Kurz	19	322
lappacea, Moq	,,	72ŧ]	Lampongo, Kurz	19	320
orbiculata, Wight	,,	724	lanceolatum, Hk. f	"	819
prostrata, Mart	,,	723	latifolium, Miq Maingayi, Hk. f	,,	322
Putranjiva, Wall	٧.	836	Maingayi, Hk. f	**	819
amblyocarpa, Muell	"	337	montanum, Hk. f	,,	8 21
Roxburghii, Wall	"	336	parviflorum, Teysm. &		
sphærocarpa, Muell	"	337	Binn 11.	320,	322
zeylanica, Muell	,,	337	persimile, Kurz	ii.	320
Pyonarrhena, Miers	í.	105	polystachyum, Hk. f	,,	32 0
mecistophylla, Miers	,,	106	Walkerii, Bl	"	321
planiflora, Hk. f. & T	"	106	Wightianum, Bl	"	319
1 10 10		106	seylanicum, Dalz. & Gibs.		321
Pycnocycla, Lindl	iï.	694	Pyracantha crenulata, Room.	.,,,	384
		694	Pyramidantha rufa, Miq	i.	81
	**	694	Pyrensrie, Bl	ï.	289
glauca, Lindl	"	63	acuminata, Planch		290
Pyonorhachis, Benth	iv.	63		"	290
Maingayi, Hk. f	"	00 1	attenuata, seem	"	

Pyrenaria	V.J	Page	Pyrus	Vα	. Page
barringtoniæfolia, Seem.	i.	290	" 1 1 TT A	'ii.	
camelliæflora, Kurs	••	290			879
Pyrethrum Athanasia, Bess.	iii.		-11-1-1	·· ,,	373
indicum, DC		814	sikkimensis, Wenzig	i. 37	8, 879
indicum, Roxb		314	/Dt 77:	ii.	
	•••	316	CALL A TITTE A		876
9 72 a.v. / a.v. Tar.		314	1 1777 11		376
		475	1	,,	374
10 71 100 7		476	1	,,	374
	••	475		,,	375
1 . 114 11 . 10/1	"	476	387-112-1-22 TIT. 6	,,	376
rotundifolia, DC Pyroles:	.!?			,,	378
	iii.	456	ep., Hk. f. & T	:	
Pyrosper mumcalophyllum, Mi		622		. Vi	
Pyrostria? spinosa, Miq		136	Pythonium bulbiferum, Schot		
Pyrranthus albus, Wall	ii.	452	Wallichianum, Schott .		518
littoreus, Jack	"	452			, 508
Pyrrhosa Horsfieldii, Wight	٧.	106	Pyzidium lividum, Moench	iv.	
Pyrrhotrichia tuberosa, W. & A.	ij.	219		. ,,	721
Pyrularia, Michaux	٧.	230	viride, Moench	. ,,	721
ceylanici, A. DC	17	234		_	
edulis, A. DC	,,	230	Quamoclit, Chois	. i⊽.	
P moschifera, A. DC	,,	235	coccinea, Moench	. ,,	199
Wallichiana, A. DC	"	234	longiflora, G. Don	. ,,	197
Pyrus, Linn	ii.	872	phænicea, Chois	. ,,	199
Aria, Hk. f. & T	12	375	vulgaris, Chois	. ,,	199
Aria, Lind	,,	375	QUERCINEÆ	. v .	598
Aucuparia, Gaertn	,	375	Querous, Linn	. v.	600
baccata, Linn	"	878	acuminata, Roxb	. ,,	607
castaneifolia, Hk. f	"	379	acuta, Ham		623
communis Linn	,,	374	aliena, Bl		608
orenata, D. Don	"	880	Amherstians, Wall		607
crenata, Lindl	"	375	anceps, Korth		610
	378,	879	Andersoni, Hk. f	•••	608
Cydonia, Linn	ii.	869	annulata, Sm		604
ferruginea, Hk. f	,,	379	Arcaula, Ham	•••	609
foliolosa, Wall		876	argyrophylla, Wall	•••	621
foliolosa, Wall	33	877	armata, Roxb		622
granulosa, Bertol	"	378	Baloot, Griff		602
Griffithii, Hk. f	"	877	bancana, Kurz		610
indica, Wall	**	369	Banga, Ham		603
2	"	877	Beccarians, Benth	•••	617
dudagamidasa D. Dan	"	881	Bennettii, Miq	•••	612
Talana Dall	>>	374	77 47		615
1 17	27	878	70		604
11	"	3 78	1		611
7	"	375		•••	609
	"			•••	618
Kumaoni, Done	**	374	Cantleyans, King		601
lanata, D. Don	"	375 975	Cassura, D. Don	•••	
latifolia, Poir	"	875	castanicarpa, Rozb	••	621
Malus, Linn	"	878 976	P caudata, Lindl		623
microphylla, Wall	"	376	Clementiana, King	• • • • • • • • • • • • • • • • • • • •	614
nepalensis, Hb. Ham	,,	374	confragosa, King		616
Nussia, D. Don	"	380	conocarpa, Oudem		612
Nussia, Ham	27	888	costate, Bl		617
Pashia, Ham	99	874	C/ 10 p www, D2		603
Pollveria, Linn	99	880	cuneata, Roxb		614
polycarpa, Hk. f	**	878	Curtisii, King	. ,,	612

_					•		•
Querous	. 1	Fol.	Page	Querous		Vol.	Page
cyclophors, Endl		₹.	615	mespilifolia, Wall		٧.	605
Cyrtorhynoba, Miq.			613				610
	•••	"	609		•••	"	
dealbata, Hk. f. & T.	•••	"		Miqueliana, Schott	•••	_"	613
dealbata, Brand	• • •	"	602	mixta, A. DC	٧.	610,	619
dealbata, Wall		,,	603	mongolica, Fisch		٣.	603
dentosa, Lindl			60 Ł				611
1 10 1.		"	615		•••	"	603
	•••	79		Poblonjata, D. Don	•••	"	
Diepenhorstri, Wenz.	•••	"	613	obtusifolia, D. Don		,,	601
dilatata, Lindl		"	602	oidocarps, Korth	• • •	- >>	603
discocarps, Hance		,,	616	Olla, Kurz			619
P divaricata, Lind'			618	1 0 11 7 17		"	614
	•••	"			•••	"	
dubia, Linell	•••	"	620	oxyodon, Miq	• • •	"	605
Eichleri, Wenz	•••	"	615	oxyrhyncha, Miq		"	605
elegans, Bl	•••	,,	609	pachyphylla, Kurz		,,	608
encleisucarps, Korth.			617	paucilamellosa, A. DC.			606
		"	612			"	615
	•••	"		penangensis, Miq	• • •	"	
Ewyckii, Korth	••	"	614	Phullata, Ham	•••	"	604
Falconeri, Kurz	•••	"	678	placentaria, Wall		,,	615
fenestrate, Roxb		"	608 -	polyantha, Lindl		**	601
£44. W7 . 11			616	7			605
fenestrata, well	•••	"			• • •	"	
feroz, Rozb	•••	"	62 3	polystachya, Wall	•••	"	610
floribunda, Lindl	•••	,,	602	pruinosa, Bl		,,	611
glauca, Thunb		,,	6)4	Pseudo-molucca, Bl		,,	611
glomerata, Rorb	•••	"	618	pyrifolia, Bl			603
						"	609
glomerata, Wall			623	racemosa, Jack	•••	"	
gracilipes, Miq	•••	V.	610	Rasea, Miq	•••	"	613
grandifolia, D. Don	•••	,,	609	rhamnifolia, Miq	•••	"	624
grandifrons, King		,,	610	Rexburghii, Endi		"	601
Griffithii, Hk. f. & T.			603	rufescens, Hk. f. & T.	•••		620
	•••	"				"	603
grosseserrata, Bl	•••	"	603	Scortechium, King	•••	"	2 - 2
Helferiann, A. DC	• • •	,,	05	semecarpifolis, Sm .	•••	"	601
hirsuta, Liudl		,,	ros	semiserrata, Rosb		,,	60 1
Horsfieldii, Miq	•••		6 04	serrata, Thunb			601
		"	611		.:.	"	620
Hystrix, Korth	•••	"				"	
Ilex, Linn	•••	,,	602	spicata, Sm	• • •	"	609
imbricata, Ham	•••	"	603	squamata, Rox'		"	609
incana, Rosb			603	sundaica, $Bl.$,,	611
	618, 6	.".		Mt			615
	•				: • •	"	605
? kamroopii, D. Don	• • •	₹.	60)	Thomsoniana, A. DC.	• • •	"	
Korthalsii, Bl	•••	"	611	tribuloides, So	• • •	"	623
Kunstleri, Kinj	•••	,,	606	truncata, King		**	618
Kurzii, Hauce			616	turbinata, Roxh	v.	610,	615
		••	606	umbonata, Hance			615
lamelloza, Sm	•••	••					606
Lamponga, Miq	•••	,,	611	velutina, Lindl	•••	"	
lanata, Sm	•••	,,	603	Wallichiana, Lindl	•••	"	610
lancezofolia, Roxb			616	Wenzigiana, Kirg		,,	613
lanuginosa, D. Don			603	xylocarpa, Kurz			618
		"	€07			6ï8,	
lappaces, Rozb	•••	,,	1	- ·	٠.		
laziflora, Lindl	•••	,,	60±	\$1 ⁰	• • • •		619
leucocarpa, Hk. f. & T.	•••	,,	615	Quinio cocculoides, Schleck		j.	101
Lindleyans, Wall		••	607	Quinquelobus glaber, Bonj.		iv.	272
		••	605	Quisqualis, Linn	•••	ii.	459
fineata, Bl		,,					160
luoida, Rozb	•••	••	614	deusifiors, Wall	•••	**	
Mackiana, Hook	•••	,,	608	ebracteata, Beauv.	•••	"	459
? macrophylla, Miq			611	glabra, Burm	•••	,,	459
70		"	617	indica, Linn	•••	"	459
		"	611	7 77			459
mappacea, Korth	•••	"	ATT	tongytora, Prest	•••	"	

Quisqualis		V al	Da ma	I Vo	. Page
Loureiri, G. Don		ii.	Page 459		1
malabarica, Bedd			460	Ranunculus, Linn.	_==
pubescens, Burm		"	459	I mania Timu	10
sinensis, Lindl		"	459	-40 - D	10
	•••	"	159	I amanan Fadah	10
C1 . CC	•••	"	459	l amakilia Tima	10
<i>sp.</i> , Griff	•••	"	100	manufacture D. D	10
Rabdochloa virgata, Beaux		vii.	291	I amanaia Liuu	മ
Radermachera amæna, See		_	384	1 44 4 75 1	10
-1			384		10
T 11 10.	•••	"	384	Total and the second se	10
	•••	"	383	2	91
		"	1000	Delen	
Ramphicarpa, vide Rha phicarpa		iv.	300	Amunitagua Wull	10
Rampinia herpetospe moi			000	ahmuanhuilan Liuu	10
	•	ii.	613	D	10
	•••	• • •	308		18
Ramtilla oleifera, DC	•••	111.	109	Cambalania Busch	17
Randia, Linn	•••	iii.		Cymbalaria, Pursh ,,	10
auisophylla, Jack	• • • •	"	114	dahuricus, Turcz ,,	19
Caudolleana, W. & A.	•••	"	113	diffusus, DC ,,	19
corymbosa, W. & A	•••	"	113	distans, Royle ,,	16
deccanensis, Bedd	•••	"	113	falcatus, Linn ,,	19
densiflora, Benth	•••	"	112	fibrosus, Wall ,,	20
dumetorum, Lamk	•••	"	110	ilacordus, Hk. f. & T ,	_
exaltata, Griff	•••	"	114	Flammula, D. Don ,,	
fasciculata, DC	•••	"	109	geranioides, Bl ,,	
floribunda, DC	•••	"	110	glabratus, Royle ,,	18
Gardneri, Thw	•••	"	112	hastatus, Walk "	17
Gardneri, Hk. f	•••	"	112	hirtellus, Royle "	
Griffithii, Hk. f	• • •	"	112	hydrocotyloides, Wall "	
hygrophyla, Hk. f	•••	"	115	hyperboreus, Rottb "	
laurifolia, Hk. f	•••	"	112	hyperboreus, Hk. f. & T. "	
longiflora, Lamk	• • •	"	111	indicus, Roxb ,,	. 19
longispina, DC	•••	"	110	javanicus, Bl ,,	
macrophylla, Hk. f	•••	"	114	leetus, Wall ,,	19
malabarica, Lamk	• • • •	. ,,	111	Lingua, Linn ,,	16
malabarica, Wall	ili.		110	lobatas, Jacquem "	17
nutans, DC	•••	iii.	110	longicaulis, C. A. Mey ,,	17
polysperma, DC	•••	"	120	membranaceus, Roy I., ,,	17
polysperma, Rox	•••	"	120	mollis, Wall ,	
racemosa, Roxb	•••	"	120	niuricatus, Linn ,,	
rigida, DC	•••	"	109	napaulensis, DC ,,	
Rottleri, W. & A	•••	33	110	natuns, C. A. Mey ,,	18
rugulosa, Hk . f	•••	"	113	nephelogenes, Edgew ,,	17
scandens, DC	•••	"	111	nervosus. Royle ,,	18
sikkimensis, $Hk. f. \dots$	•••	"	114	nivalis, Linn ,,	19
speciosa, Hk. f	•••	"	117	obt ctus, Wall ,,	19
spinosa, Bl	• • •	"	110	pedatifidus, Sm "	18
stipulosa, Miq	•••	٠,,	110	pedatifidus, Led.b "	18
stricta, Roxb		"	121	pennsylvanicus, Linn ,	19
tetrasperma, Benth. & H	k. ſ.	,,	109	pimpinelloides, D. Don ,,	14
tomentosa, Hk . f	•••	,,	110	pinnatus, Wight "	20
tomentosa, W. & A	•••	"	110	polypetalus, Royle ,,	21
uliginosa, DC	•••	,,	110	pulchellus, C. A. Mey ,,	17
venulosa, Wall	•••	"	121	Purshii, Hook ,,	18
Wallichii, $Hk. f.$	•••	,,	113	pygmæus, Vahl ,,	18
RANUNCULACEE		i.	1	radicans, Hk. f. & T "	. 18

_			•	•
Ranunculus	Vol.	Page	v	o . Page
radicans, C. A. Mey	i	18		. 36 3
reniformis, Wall	,,	16	16	,, 364
	•••	19	107_11: -1.22 To	. 004
	"	19		,, 304
riparius, Edgew	"		Regnaldia cluytioides (lapsu	440
sagittifolius, Hook	"	17		v. 460
salsuginosus, Wall	"	17		ii. 256
salsuginosus, D. Don	"	17	hexapetala, Roth	,, 259
sceleratus, Linn	"	19		v. 303
subpinnatus, W. & A	"	19	A and Laure der Wilmha	, 303
Audiahadasa D. Dam	• • •	19	alassana Mi-	909
	"	20		″ ໘∩1
tuberculatus, DC	"			
vestitus, Wall	"	21	Povalifolia, Wight	, 302
vitifolius, Royle	"	19		, 302
Wallichianus, W. & A	"	20		. 411
sp., Griff	,,	19	indica, Dumort	,, 412
RAPHANEE	ï	130	wanana Dianah	, 412
Raphanus, Linn	i.	166	totanguma Dlanck	, 412
· , , , , , , , , , , , , , , , , , , ,		166	Animuma Dlanck	410
	"	166	Antonia Dala & Othe	410
Raphanistrum, Linn	"			·
sativus, Linn	. "	166		
Raphistemma, Wall	iv.	19		, 677
ciliatum, Hk. f	,,	20	maritima, Aubl ,	, 677
Hooperianum, Done	"	19	pedunculata, Br ,	, 677
pulchellum, Wall	"	19	Winksing Mass	, 677
Rapinia herbacea, Lour	iii.	438	1	i. 521
		425	II-alianiana Cahatt	599
Rapuntium arenarioides, Presl	iii.			, E01
cæspitosum, Presl	"	425	vivipara, Schott ,	
campanuloides, Presl	"	425	vivipara, Wight ,	
coloratum, Presl	,,	426	Renanthera, Lour v	
Leschenaultianum, Presl	11	427	angustifolia, $Hk.f.$, 49
nicotianæfolium, Presl	"	427	Arachnitis, Lindl vi. 2	ห, 197
Nummularium, Presl		422	bilinguis, Rohb. f v	i. 28
	"	426	T	49
	"	425	1 1 27	, 40
radicans, Presl	"			′ ୨ହ
trialatum, Presl	"	425	Flos-aeris, Rohb. f ,	. 49
Wallichianum, Presl	,,	426	histrionica, Rchb. f,	,
Ratonia Lessertiana, Benth.			labrosa, Rohb. f ,	
& Hk. f	i.	678	matutina, Lindl ,	, 49
sumatrana, Kurz	,,	679	micrantha, Bl ,	40
Ratzeburghia, Kunth	vii.		Rencalmia calcarata, Haw. v	i. 254
	153,		fasciculata, Rosc ,	. 241
3			41 O. 11-1-1	955
Schimperi, Stead		161	mutica, Saliab ,	256
Rauwolfia, Linn	iii.	632	nutans, Andr ,	
Beddomei, Hk . f	"	634	Rennellia, Korth ii	
decurva, Hk. f	,,	63 3	вресіова, $Hk. f.$	
densiflora, Benth	,,	633	Reptonia, $A.DC$ ii	
micrantha, Hk . f	"	633	buxifolia, A. DC ,	, 534
microcarps, Hk. f		633	Reseda, Linn ii	
	"	634	Aucheri, Boiss	. 181
nitida, Linn	"	632	bracteata, Boiss	101
peguana, $Hk. f. \dots \dots \dots$	"			101
Pulaparia, Rozb	"	634	luteola, Linn ,	101
serpentina, Benth	,,	632	nilgherrensis, J. Mull,	
Ravenala madagascariensis,			odorata, Linn ,	
Sonn	vi.	198	oligandra, Edgew ,	
Rasumovia tranquebarica,			pruinosa, Del ,	, 181
	i =	801		. 180
			m 41 14 D-4-	
Rectomitra tuberculata, Bl.	II.	553	. 200000 0.00000000, 20000	

V.	۱ (۵	Deme I	•	Val -	Page
Relinodendron lanceæfolium,	01. 7	Page	Rhaphidophora, Schott	vi.	518
	i.	303	. 60 . 12 . 61 . 1		549
2201121 111 111 111	v.	219	4.6.1. (0.1.4.	"	543
	i.	686		"	546
	▼.	C14		"	545
		145	calophylla, Schott caudata, Schott	,,	549
	"	145		"	543
	"	145	orassifolia, Hk. f	"	549
lycioides, Mart	,,	145	Cunninghamii, Schott	"	547
	"	-10	decursiva, Schott	"	547
Rhabdochloa mucronata, Beauv	-::	296	eximia, Schott	"	547
	iii.	892	glauca, 8chott	"	545
		392	gracilipes, Hk. f	"	547
Hedypnois, Fisch. & Mey.	"		grandis, Schott	"	
Koelpinea, Willd	"	892	Hookeri, Schott	77	548
	i.	642	Korthaleii, Schott	"	548
	"	641	Kunstleri, Hk. f	"	543
		630	lacera, Hassk	"	549
	i.	638	lancifolia, Schott	,,	545
	"	612	Lobbii, Schott	,,	544
	,,	638	Maingayi, Hk. f	,,	543
c tharticus, Linn	"	639	minor, <i>Hk. f.</i>	,,	544
circumsci-sus, Linu. f	,,	641	Peepla, Schott	"	545
dahuricus, Pall	,,	639	Peepla, Schott	"	544
filiformis, Roth	,,	641	pertusa, Schott	,,	546
9 -l-bunders Homes	"	636	pinnata, Schott	"	549
.1.1 D	"	639	pinnatifida, Schott	"	549
1	"	639	Schottii, Hk. f	"	544
Total at Land	"	632	Scortechinii, Hk. f	"	54)
lineatus, Linn	"	638	tetrasperma, Hk. f	"	548
1 1 D	"	641	Wallichii, Schott	"	E49
myrtinus, Burm	,,	641	Wrayi, Hk. f	"	544
Napeca, Linn	"	635	Rhaphidospora ciliata, Nees	iŸ.	536
Manutin Omnome	"	623	dichotoma, Nees		540
mimalameta Tayna		640	glabra, ` o s	"	535
A Tour Disease	"	633	/TN A., J	"	533
Combin Line	"	634	Rhaphiophallus, Scheit	۷i.	518
70 771 - 1	"	641	D1 1 · - 1 · - 1	vii.	188
The state of the s	"	639	ailialutu Naaa		193
	"	638	an amed an Mana	"	193
m. I	"	639		"	179
	"	640	anti-unitada Nan .	"	188
	"	639	Coulton Door	"	188
purpureus, Edgew	"	64)	tanian tan Mana	"	188
rupestris, Royle	"	641	Total Committee of the Name	"	179
theezans, Linn	"	641	4-1/- D	,,	191
trigynus, D. Don	"		orientalis, Desv	"	179
triqueter, Laws	"	639.	repens, Nees	"	
virgatus, Roxb	"	639	Royleana, Nees	"	188
Wightii, W. & A	"	689	stricta, Nees	"	176
xylopyrus, Rets	"	634	trivalvis, Lour	,,	188
	▼.	288	villosula, Nees	"	179
	٧.	800	Wightiana, Nees	"	191
fistulosa, Benth	"	30)	zeylanica, Nees	;,	192
longiflors, Benth	"	800	Rhaptomeris Burmanni, Miors		104
	vi.	197	Rhazya, Done	iii.	
Gardneri, Thw	17	115	striota, Done	27	640
ovalifolia, Lindl	"	115	Rhesa (vide Bhesa)	i.	622
rubens, Lindl	"	115	Rheum, Linn	v.	65
•					

					•		•
Rheum	•	Vol. 1	Page			Vol.	Page
acuminatum, Hk. f. &	T.	٧.	57	Rhododendron, Linn		iii.	
? australe, D. Don		"	57	æruginosum, Hk. f		,,	466
Emodi, Wall	•••	"	56	album, Sw	•••	",	465
Emcdi, Wall	•••		57	Anthopogon, D. Don	•••	"	472
Emodium, Wall		"	56	1 • 1 · 1 · 1 · 7 · 6 ·			465
	•••	"	56		•••	"	464
Moororoftianum, Royle		"	56		•••	"	473
		"		aromaticum Wal'	•••	"	468
Moorcroftianum, Meissn		"	56	Aucklandii, Hk. t	•••	"	
nobile, Hk , f , g , T ,	•••	"	57	barbatum, Wall	•••	"	468
spiciforme, Royle	•••	"	55	Batemani, Hook	•••	"	466
tibeticum, Maaim	•••	"	56	bhotanicum, Clarke	•••	"	475
Webbianum, Royle	•••	"	57	blandford æftorum, Hk.	f.	"	474
sp., Hk. f. & T	•••	"	56	Blume, Nutr	•••	,,	466
Rhinacanthus, Nees	•••	iv.	54l	Boothii, Nutt		"	470
calcaratus, Nees	•••	,,	541	calopylla, Nuit		"	473
communis, Nees		"	541	camelliæflorum, Hk. f.	••	,,	470
Rottleriañus, Nees		"	541	campanulatum, D. Don		,,	466
RHINANTHIDEE		iv.	248	Campbelliæ, Hk. f		,,	465
? Rhinanthus bifidus, Hi		iv.	314	campylocarpum, Hk. f.		"	467
indica, Linn			610	Can lelabra, Hk. f		"	468
Rhiniachne Princeps, Hcol		y) Vii	148	celebicum, DC			468
Rhipidostigma, Hassk.		***	552	ciliatum, Hk. f		"	470
DLIII A L	•••	ii.	658	cinnabarinum, Hk. f.	•••	"	474
	٠.		658	cinnamomeum, Wall.		"	4+5
Cassytha, Gaerin	•••	??			•••	"	469
Rhizophora, Linn	•••	ii.	435	Dalhousize, Hk. f	•••	"	
Ægiceras, Linn	•••	iii.	533	deflexum, Griff	•••	"	174
apiculata, Bl	•••	ii.	436	Edgarii, Gamble	•••	"	406
Candel, Linn	•••	"	437	Edgeworthii, Hk. f	•••	"	469
candelaria, DU	•••	"	436	elæagnoides, Hk. f	•••	11	471
candelaria, W. & A		"	435	eximium, Nutt	•••	,,	465
caryophylloides, Jack	•••	,,	438	Falconeri, Hk. f	•••	"	465
caseolaris, Linn	•••	"	580	formosum, Wall	•••	,,	473
conjugata, Linn		"	436	fragrans, Maxim		,,	472
corniculata, Lian	•••	iii.	533	fulgens, Hk. f		"	466
cylindrica, Linn		ii.	438	glaucum, Hk. f		"	171
cylindrica, Roxb	•	"	438	Gibsonii. Paxt		"	473
decandra, Roxb	•••		436	grande, Wight		,,	464
gymnorrhisa, Roxb		"	437	Griffithianum, Wight		,,	468
macrorrhiza, Griff		"	435	Hodgsoni, Hk. f	•••	,,	461
Mangle, Linn		"	435	Hookeri, Nutt	•••	"	468
mucronata, Lam	•••	"	435	jasminiflorum, Hook.	•••	"	463
	•••	"	438	javanicum, Benn			463
	•••	"	436	Jenkin-ii, Nutt		"	473
stylosa, Griff	•••	"	436	l	•••	"	466
timorensis, DC	<u>;;</u> .	494			•••	"	571
RHIZOPHOREE		434,		Keysii, Nutt	•••	"	463
Rhodamnia, Jack	•••	11.	468	lampongum, Miq	•••	"	
cinerea, Griff	•••	"	468	lanatum, Hk. f	• • •	"	467
oinerea, Jaok	•••	"	469	lancifolium, Hk. f	•••	"	469
concolor, Miq	•••	"	468	lepidotum, Wall	•••	**	471
Mulleri, Bl	•••	**	469	leptocarpum, Nutt	•••	"	471
Nageli, Mig	•••	"	469	longifolium, Nutt	•••	"	464
spectabilis, Bl	•••	"	469	luoidum, Nutt	•••	"	475
subtriflora, Bl	•••	"	469	macranthum, Griff		,,	478
trinervia, Bl	•••	"	468	macrocarpos, Griff		"	46)
Rhodiola asiatica, D. Don		ii.	419	Maddeni, Hk. f		"	472
imbricata, Edgew	••••		417	malayanum, Jack	•••	"	462
		"	417	micranthum, Maxim.		"	472
rosea, Linn	•••	"			•••	**	

Rhododendron	Vol.	Page	Rhus		Vol. 1	Page
moulmainense, Hook	iii.	463	Buckiamela, Roxb	• • •	ij.	10
nilagiricum, Zonk	,,	466	Cobbe, Linn		i.	673
nivale, $Hk.f.$,,	472	Cotinus, Linn		ii.	9
niveum, Hk. f	•••	466	decipiens, W. & A	•••	j.	540
nobile, Wall iii.		, 46 S ′	? Dhuna, Ham		ii.	11
Nuttallii, Booth	iii.	470	fraxinifolia, D. Don	•••	i.	490
oblongum, Griff	,,	468	Griffithii, Hk. f	•••	ii.	12
obovatum, Hk. f	"	471	insignis, Hk. f		,,	11
palustre, Turoz		472	integerrima, Wall	•••	"	13
Parishii, Clarke		475	javanica, Lipp	•••	"	10
	• • •	472	juglandifolia, Wall.			11
parvifolium, Adams		472	Kakrasingee, Royle		"	13
d1 /// f		469	khasiana, Hk. f			10
7 10 11 37 11		466	7 W-11		"	9
		471	· · · · · · · · · · · · · · · · · · ·	•••	"	9
		471		•••	>>	10
	• • •	465		٧.	97	. 9
puniceum, Roxb		474	parviflora, Roxb punjabensis, Stewart	•••	"	10
Roylei, Hk. f		471	1	•••	>7	10
salignum, Hk. f	• • • • • • • • • • • • • • • • • • • •	472	semi-alata, Murr	•••	ii."12	
setosum, D. Don	•••	467	succedanea, Linn			9
Shepherdii, Nutt	, ,,	-	velutina, Wall	•••	ii.	11
Smithii, Nutt	. ,,	469	vernicifera, DO	•••	"	
sparsiflorum, Nutt	• ,,	470	Wallichii, Hk. f		".	11
Teysmanni, Miq	,,,	463	Rhyncanthera paniculata,		₹î.	91
Thomsoni, Hk. f	. ,,	468	Rhyuchanthus, Hk. f.	•••	vi.	257
triflorum, Hk. f	. ,,	474	longiflorus, Hk. f	••	"	257
tubistorum, DC	. ,,	453	Rhynchelytrum Wightii,			
vaccinioides, Hk . f	, ,,	464	Duthie	•••	vii,	
Veitchianum, Hook	٠,,	473	Rhynchocarpa, Schrad.	•••	ii.	627
venosum, Nutt	, ,,	465	P deltoides, Kurz	•••	"	627
virgatum, Hk. f	. ,,	474	fætida, Schrad	•••	,,	627
Wallichii, Hk. f	. ,,	466	rostrata, Kurz		"	627
Wightii, Hk. f	. ,,	467	Rhynchodia, Benth	•••	iii.	6 66
Windsorii, Nutt iii.	464	, 465	Wallichii, Benth	•••	"	667
sp., Griff. iii. 464, 465,	466,	467,	Rhynchoglossum, Bl.	•••	i▼.	367
458, 469, 471	, 478	, 474	Blumei, DO		"	367
	. ii.	469	obliquum, Bl	•••	"	367
tomentosa, Wight		469	obliquum, Hohen	•••	,,	366
Rhodora deflexa, Griff	. iii	461	obliquum, Wight		"	367
Rhodoracea, Griff			scabrum, Dalz		"	366
Rhodoraceæ, Griff		. 461	zeylanicum, Hook	•••	"	367
RHODOREES		456	Rhyncholepis, ? Rozburgh	ii.	••	
Rhomboda longifolia, Lindl.	vi.		Miq		٧.	88
Rhopala attenuata, Jack		190	Rhynchopyle elongata, En	gl.	٧i.	539
excelsa, Roxb		191	Rhynchosia, Lour	•	ii.	220
glabrata, Wall		191	acutissima, Thw	•••	,,	226
moluccana, Jack		190	aurea, DC	•••	"	221
racemosa, Roxb		190	avensis, Benth	•••	"	222
robusta, Roxb		101	Beddomei, Baker	•••		222
Rhopaloblaste singaporensis,			biftora, DC	•••	"	215
Hk. f	•	413	bracteats, Benth			225
Rhopalocnemie, Jungh		238	cana, DC		"	222
-1-11-13 71		239		•••	"	224
			" ' TOO	•••	"	221
Rhuacophila javanica, Bl	••	9	capitata, DU coodoorensis, Bedd.	•••	"	220
Rhus, Linn		12		•••	"	229
acuminata, DC		10	crotalarioides, DC	•••	"	222
Amela, D. Don	. ,,	10	cyanosperma, Benth.	•••	"	

D1 1 1 1				•	
Rhynchosia		Paga	Rhynchotechum	Vol.	Page
densiflora, DO	ii.	226	sp., Wall	i٧.	362
densistora, Wall	,,	2 2 l	Rhytidandra, A. Gray	ii.	742
	,,	2 21	Rhytiglossa? indica, Wawra	iv.	543
ervoidea, DC	,,	223	? ptychostoma, Nees		534
Falconeri, Baker	,,	224 1	radicosa, Nees		544
filicaulis, Grah	,,	224	Ribes, Linn		409
filipes, Benth	,,	221	Ribes, Linn		410
Clark and Wall		219		•••	410
Heynei, W. & A		220	desmocarpum, Hk. f. & T.	••	410
himelensis Danik		225		•••	410
	,,	224	glaciale, Wall	93	
India DO	,,		glutinosum, Jacq	"	410
lucida, DC	,,	191	Griffithii, Hk. f. & T	"	411
Mammania DO	,,	223	Grossularia, Linn	**	410
	,,	224	heterotrichum, Ledeb	"	410
	••• ,,	223	himalayens, Dcoo	"	411
minima, DC	,,	223	himalensis, Royle	,,	410
	,;	226	laciniatum, Hk. f. & T	,,	410
	,,	223	leptostachyum, Done	1,	410
Nummularia, DC	,,	221	luridum, Hk. f. & T	79	410
pilosa, Wall	,,	224	nigrum, Lian	"	411
macadaada Chark	,,	223	orientale, Poir	,,	410
Donald comm. Com.	,,	223	rubrum, Linn	"	41 L
marlarani landa - Chaalan	••• ,,	224	villosum, Wall	"	410
		223	RIBESIEÆ	iï.	389
i\/1		196	Richteria pyrethroides, Kar.	•••	000
made a come TVA	;:	220		iii.	315
	11		& Kir		
	,,	215	Rioinus, Linn	V.	457
	,,	225	communis. Linn v.	239,	
	,,	225	dioicus, Wall	٧.	425
	,,	221	furfuraceus, Wall	72	353
	,,	224	inermis, Jacq	"	457
	,,	221	inermis, Wall	"	448
velutina, Grah	,,	215	lividus, Jacq	,,	457
vestita, Wall	,,	216	Mappa, Roxb	"	447
villosula, Thw	,,	225	montanus, Wall	"	462
	,,	219	salicinus, Hassk	"	455
minable DO	• • • • • • • • • • • • • • • • • • • •	154	speciosus, Burm	"	457
-! D.O	••	225	spectubilis, Bl		457
With Many of Carlo		212	Tanarius, Linn	"	447
Rhynchospermum, Reisw	. iii.	218	- · · · · · · · · · · · · · · · · · · ·	"	482
		248		"	452
Physichospermum A DC	;;			"	457
		667		ri. '38	
107 11/21/21 A TOO	,,	667		71. OC	, 72
		667	Riedelia, Trin.	_!!	70
	ii. 668,			¥ii.	78
Rhynchostylis, Bl	vi. 32,		Riedlea, Vent.		
	v i.		concatenata, DC	i.	374
	,,	32	corchorifolia, DC	"	374
	,,	32	supina, DC	"	374
D1	,,	32	tiliæfölia, DC	,,	874
TO 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	iv.	372	truncata, W. & A	"	874
14 14 11 101 1	,,	374	Rindera glochidiata, Wall.	i ∀.	161
01 1	,,	374	Ripidium Ravennæ, Trio		121
-115-45 4 75/1		873	Rissoa zeylanica, Arn	i.	512
1_4:0_1: T2L # 0.70		374	Rives, Chois	iv.	183
	,,	873	Davis Davis		184
	,,	378		"	191
vestitum, Hk. f. & T.	,,	010	cuneata, Wight	, "	191
VAL VII				A a	

Rives	17-) T		Vol. Dome
fragrans, Nimmo	Vol. I iv.	184	Ropalopelalum uniflorum, Vol. Page
hirsuta, Wight		189	Griff i. 55
hypocrateriformis, Chois.		184	Rosa, Linn ii. 363
Pobtecta, Chois	••	186	alba, Linn ,, 364
ornata, Chois	,,	183	anseriumfolia, Boiss " 365
ornata, Aitoh		184	Banksia, Br ,, 364
pomacea, Wight		188	bicolor, Jucq ,, 366
tilizfolia, Chois		184	bracteata, Wendl ,, 364
seylanica, Thw	,,	187	brevicuspis ,, 368
Rivina lavis, Linn	v.	21	Brunonii, Liodl ,, 367
Lathenia, Ham	,,	21	Brunonis, Wall ,, 367
orientalis, Moq	"	21	centifolia, Linn ,, 364
Robartia (vide Bobartia)		602	chinensis, Jacq " 364
Robergia hireuta, Roxb	ii.	28	damascena, Mill " 364
Robinia candida, Roxb		111	Eglanteria, Mill ,, 364
ferruginea, Roxb	••	246	Eglanteria, Linn ,, 366
fruticosa, Roxb		109	Fortuneana, Lem ,, 364
Heynei, Wall		251	frayrans, Redouté , 364
macrophylla, Roxb	"	108 240	gallica, Linn ,, 364 glandulifera, Roxb ii. 364, 367
mitis, Linn	••	116	glandulifera, Roxb ii. 364, 367 Gulielmi Waldemarii, Klotz ii. 366
pygmæa, Linn racemosa, Róxb	,,	105	77-45
	•	110	Unalisma Dantal 988
	••	110	Washeniana Wall 966
uliginosa, Willd	"	241	indica Linu 361
Rochelia, Rchb	,,	165	inermis, Roxb ,, 364
barbata, R. & S		163	involucrata, Roxb ,, 365
cardiosepala, Bunge		166	Jacquemontii, Crep ,, 3'i8
echinophora, R. & S		163	Leschenaultians, W. & A. " 368
macrocalyx, Bunge		166	Lindleyana, Tratin " 365
rectipes, Stocks		166	Lindleyi, Wall ,, 367
Redowskii, R. & S	,,	163	longicuspis, Bertol ,, 367
eaccharata, Rehb	"	166	lutea, Mill ,, 366
stellulata, Rchb	,,	166	Lyellii, Lindl ,, 365
stellulata, Aitoh	,,	166	macrophylia, Lindl ,, 366
stylaris, Boiss	."	166	microcarpa, Lindl ,, 364
Rodetia Amherstiana, Moq.		716	microphylla, Lindl , 364 Moorcroftii, Wall ,, 368
Rolfinkia centaurioides, Zenk.		227	Moorcroftii, Wall ,, 368
Rondeletia asiatica, Linn		102	moschata, Mill ,, 367
cinerea, Wall	"	37 39	
corriacea, Wall	"	41	malaustais Durch 265
corymbosa, Jack esserta, Roxb	"	87	minuminallifalia III. # A.T. 266
a / D & C	"	87	mulasama Damb 967
longifolia, Wall	"	95	Panini Boiss 864
lucida, Wall		108	9 manual Domb 987
mollis, Wall		104	semperflorens, Linn ,, 364
orissensis, Roth	"	87	sempervirens, Hk. f. & T. " 368
paniculata, Roth	"	89	sempervirens, Linn ,, 367
provima, D. Don	,,	38	serices, Lindl ,, 367
spicata, Wall	"	41	sinica, Ait ,, 364
spicata, Wall stricta, Both		121	sinica, Linn , 364
tetrandra, Roxb	"	54	sulphurea, ∆it. ,, 364
thyrsiflora, Roth	"	87	tetrapetala, Royle ,, 367
tinctoria, Bl	"	89	torulosa, Wall ,, 366
_ tinctoria, Roxb	"	38	triphylla, Roxb ,, 364
Rondeletiez iii.	18,	37	unguicularis, Bertol " 366

Rosa	Vol.	Page	Rottboellia Vol. Page
Wallichii, Sabine	ii.	368	arundinacea, Hochst vii. 156
Wallichii, Trattin		367	hidean Dank 005
Webbiana, Wall	"	366	allianta Will A north
Rosacea, Wall	ii.	378	(1)-1-1 77 1
ROSACEÆ	ii.	307	accomplanata Son
Roscoea, Sm	•	207	150
alpina, Royle		207	
capitata, Sm	"	208	71. 4 ,
elatior, Sm	"	208	somermann Well 154
ama ailia O	"	208	somumborg Fign # 160
langitalia Dulan	"	208	/ / / / / / / / / / / / / / / / / / /
7-4 101-	"	208	1 33 186
	57	209	dimidiate Thanh 01
	"	207	di
	"	208	1
	"	207	
	"	•209	analessa Tinn 6 150
	:"		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Rostoea, Roxb	iv.	602	fasciculata, Lamk ,, 153
pentandra, Roxb	"	602	geminata, Hack vii. 159, 160
tomentosa, Roxb	"	603	genuina, Hack vii 157
villosa, Roxb	."	603	gibbosa, Hack ,, 156
Rosez	ii.	308	glabra, Roxb ,, 153
Rostellularia abyssinica,			glandulosa, Trin ,, 157
Brongn	iv.	539	gymnorhiza, Ham ,, 156
adenostachya, Nees	"	539	? Hamiltoni, Trin ,, 154
crinita, Neos	"	536	Helferi, Hk. f ,, 158
diffusa, Nees	,,	538	hirsuta, Forsk ,, 160
glandulosa, Nees	,,	539	hirsuta, Vahl ,, 162
gracilis, Wight	"	548	hispida, Roxb , ,, 156
hedyotidifolia, Nees	"	538	khasiana, liack ,, 157
mollissima, Nees	,,	539	khasiana, Munrs ,, 157
peploides, Nees	"	537	laevis, Retz ,, 158
procumbens, Nees	"	539	longiflora, Hk. f ,, 154
procumbens, Wight	"	5 39	merguensis, Hk. f ,, 158
quinquangularis, Noos	"	537	muricata, Retz ,, 140
rotundifolia, Nees iv.	588	539	Myurus, Benth ,, 154
Royeniana, Nees	iv.	537	nigrescens, Thw ,, 157
		544	paleaces, Steud ,, 91
	"	537	perforata, Roxb vii. 158, 160
	"	538	pilosa, Roth vii. 281
Rostkovia ensiformis, Ham.	vi.	396	pilosa, Willd ,, 366
		309	159
Rostraria pubescens, Trin.	Vii.	568	100
Rotala apetala, F. Muell	ĭi.		159
P decussata, DO	"	569 568	q waster 100, 424221 111 111 111 111 111
filiformis, Hiern	"		Dt 189
myriophylloides, Welw	"	572	repend, realer in in in
Roxburghiana, Wight	"	569	, 250,000,000,000,000,000,000,000,000,000,
verticillaris, Linn	"	567	, , , , , , , , , , , , , , , , , , ,
sp., Wall	".	572	7
Rotang Pajare, Griff	vi.	459	100000, 21000
Rothia, Pers	ii.	63	spathacea, Ten ,, 153
trifoliata, Pers	. 22	63	speciosa, Hack ,, 152
Rothmannia macrophylla, Br.		114	striata, Necs ,, 157
Rottboellia, Linn. f	vii.		Talboti, Hk. f ,, 155
acuminata, Hack	"	155	Talboti, Lisbos ,, 156
altissima, Poir		153	Thomsea, Koen ,, 366
anceps, Ham		153	thyrsoidea, Hack " 152
	•••		

Rottboellia		Vol. ∶	Page	•	Vol	Page
? triacantha, Roth			284	Roucheria, Planch	i.	418
tripsacoides, Lamk.		"	91	~ · · · · · · · · · · · · · · · · · · ·		414
villosa, Poir	•••	. ,,	159	Roumea heberarpa, Gardn	"	195
Zes, Clarke		"	152	Jangomas, Spreng	,,	198
Psp. Wall	٠	"	157	Roures, Aubl	ii	. 47
Rottlera, Vahl		iv.	353		,,	48
incana, Vahl		,,	353	caudata, Planch	,,	48
Rottlera, Roxb.		••		commutata, Planch	,,	47
AD in TT		₹.	442	concolor, Bl	,,	49
alha, Roxb		,,	429	dasyphylla, Miq	., ,,	54
aurantiaca, Hook. &	Aro.	"	442	diversifolia, Miq	i.	440
aureo-punctata, Dal	z	>>	438	fulgens, Planch	. ii.	
barbata, Wall		99	428		,,	50
bifaria, Ham		,,	459		,,	49
congesta, Ham		"	459		,,	48
P cordifolia, Benth.		"	442	rugosa, Planch	,,	48
digyna, Thw		"	453		,,	47
dioica, Baill	•••	"	442		,,	51
eriocarpa, Thw.		"	432	similis, Bl	,,	49
fascioulata, Ham.		"	459		,,	50
floribunda, Hassk.		"	432		,,	49
fuscescens, Thw.	•••	"	441		,,	48
indica, Willd		"	423		,,	49
integrifolia, Ham.		"	447		,,	49
javanica, Hassk.		"	451		11.	50
lanceolata, Ham.		"	459		,,	50
lappacea, Wall.		"	425		YI	
macrostachya, Miq.	•••	"	429		i.	575
mappoides, Dalz.		"	429		•• "	575
mollis, Wall	•••	**	442	C1	vi.	
mollissima, Wall.	•••	"	421	Gloriosa, Pers	,,	298
montana, Heyne	•••	"	451		,,	298
montana, Wall.	•••	"	442		,,	298
muricata, Thw.	••• •••	"	437		,,	298
oppositifolia, Thw.	•••	"	440		,;	298 297
paniculata, A. Juss			430		Vi	. 237 180
paniculata, Wall.	▼.	429,			i.	409
peltata, Miq	•••	٧.	430 428	floribunda, Planch	: 186	109), 409
peltata, Roxb	•••	"	428 429		100	
peltata, Wight		"	442		·· •	180
rhombifolia, Thw.	•••	"	433	Th	•	
rhynchophylla, Miq. ricinoides, A. Juss.		"	430	-1 T27 72		679
scabrifolia, A. Juss.		"	442	70 1 37	,;	
subpeltata, Baill.	•••	"	438	71		
suffruticosa, Wall.	•••	"	462		iii	
Tanaria, Hassk.	•••	>>	447	I		203
tetracocca, Roxb.	•••	"	429	_7_4_ TIŽ_11 **		202
Thwaitesii, Baill.		"	423	albinamlia Duina	••	204
tinctoria, Roxb.	•••	37	442		,,	203
tomentosa, Hassk.	•••	"	447			203
tricocca, Roxb		"	442	chinensis, Regel & Maac	,,	202
trinervis, Zipp		"	442	3'A-1'- T'		202
wrandra, Dalz		"	444	171 J	•• ,,	203
viscida, Bl		"	442	1.1	,,	203
Zippelii, Hassk.	•••	"	430	! T OO '	,,	202
Rotula aquatica, Lour.		i♥.	145	77.47 7 701	••	204
			'		.,	

Dubia		_	1 D-1)	•	
Rubia.		Page	Rubus			Page
mitis, Miq	, iii.		Hamiltonianus, Ser	•••	ii.	830
Mungisth, Desv	٠,,	202	Hasskarlii, Miq	• • •	. ", ·	329
Munijista, Roxb	. ,,	202	hexagynus, Roxb	• • •		327
purpurea, Done	٠,,	202	hibiscifolius, Focke	•••		312
scandens Zoll. & Mor	,,,	202	hirtus, Roxb			336
secunda, Moon		202		unth		
sikkimensis, Kurz		203	& Bouché			342
tibetica, $Hk. f.$		204	Hookeri, Focke	•••		33 ŧ
tinctorum, Linn	• • •	203	horridulus, Hk. f	•••	• • •	311
Rubiacea, Wall. i. 641, iii.	100	108	Horsfieldii, Miq			339
109, 111, 112, 113, 116,	190	121	hypargyrus, Edgew.	•••	**	335
123, 125, 132, 133, 135,	120,	147	indiana Harma	•••	"	839
159, 160, 162, 171, 174,	177	190		•••		
100, 100, 102, 171, 174,	1//,	100,	indicus, Lesch	•••	• ••	328
181, 183, 185, 189			insignis, Hk. f	•••	"	329
RUBIACEÆ			Ischelus, Hb. Ham	•••	**	339
Rubus, Linn	ii.	326	lævigatus, Wall	•••	**	338
acerifolius, Wall	**	329	lanatus, Wall	•••	**	331
acuminatus, Sm	"	327	lasiocarpus, Sm	•••	,,	339
affinis, Madden	"	337	lasiocarpus, Sm	•••	,,	340
albescens, Roxb	,,	339	lineatus, Reinw	•••	,,	333
alceæfolius, Poir	17	330	lobatus, Wall	•••	33	327
alpestris, Bl	"	332	longifolius, Wall	•••	••	339
Andersoni, Hk. f	"	333	lucens, Focke		"	338
antennifer, Hk. f	"	837	macilentus, Camb	·	"	336
asper, D. Don		341	macrocarpus, Gard		330,	
asper, Hb. Royle	"	336	macrocarpus, Kurz		ii.	
	"	328	micranthus, D. Don	•••		339
	"	327	micropetalus, Gard		330,	
betulinus, D. Don	>>					
biflorus, Ham	"	338	microphyllus, D. Don	•••	. 11.	340
bijugus, Focke	"	339	moluccanus, Linn	•••	"	330
birmapious, Hk. f	"	331	mysorensis, Heyne	•••	**	339
calycinus, Wall	"	327	niveus, Wall	•••	**	335
Clarkei, $1!k$. f	"	337	nutans, Wall	•••	"	334
cæsius, Linn	,,	335	opulifolius, Bertol	•••	"	340
colchicus, Stev	,,	338	oxyphyllus, Wall	•••	**	327
concolor, Royle	"	335	palmatus, Thunb	• • •	- ,,	342
concolor, Wall	,,	335	paniculatus, $Sm.$	•••	"	329
cordifolius, D. Don	,,	330	paniculatus, Clarke	• • • •	"	342
discolor, Weihe & Neos	"	337	paniculatus, Moon		**	336
distans, D. Don	",	339	paniculatus, Roxb	•••	,,	342
elliptious, Sm		336	parvifolius, Linn	•••		312
ellipticus, Wall	"	337	? parvifolius, Moon	•••	"	339
Fairholmianus, Gard. ii.	330.		parvifolius, Sm			340
	ii.	329	paucistorus, Wall	•••	. "	339
ferox, Wall		330	pedunculosus, D. Don	•••	••	335
Finlaysonianus, Wall	"	336	pentagonus, Wall		,,	332
flavus, Ham	"		107:11.3	•••	,,	341
Fockeanus, Kurz	"	334		•••	••	333
foliolosus, D. Don	"	340	pulcherrimus, Hook.	•••	"	
fragarioides, Bertol	"	332	pungens, Camb	•••	••	311
frazinifolius, Poir	"	342	purpureus, Bunge	•••	"	337
fruticosus, Linn	"	337	pyrifolius, Ham.	•••	"	828
furfuraceus, Wall	"	339	pyrifolius, Hk. f. & T.	•••	"	328
	328,	331	racemosus, Rosb	•••	,,	840
Gowreephul, Roxb	ii.	336	reflexus, Kor	•••	"	33 0
gracilis, Roxb	,,	333	reticulatus, Wall			831
Griffithii, Hk.f	"	327	rosæftorus, Roxb			839
Hamiltoni, Hk. f		328	rosmfolius, 8m	•••		841
Transferences true le	"	'		• • • •	••	

Rubus	,	701. F	lama I	Ruellia		,	Vol. P	8.08
rotundifolius, Royle			339			•••	iv.	473
rotundifolius, Wall		336,		comosa, Roxb		•••		430
Roxburghianus, Wall.			342	? comosa, Wall	•••	•••		3 99
TO T 1 TEL 4			340			•••		423
rugosus, Sm (.		••	330'	"TIA 11 TT 11	•••			428
		"	333	coromandeliana, Wa			493,	494
471.6 7.1 7.6.1		"	336	crenata, Benth	•••	•••		425
sessilifolius, Miq		"	336	crispa, Linn		•••		446
sikkimensis, Kunze		"	341	orispa, Nees		•••		423
		"	342	Cusia, Ham			••	458
		"	332	cuspidata, Wall.	:		••	519
Thomsoni, Focke		"	331	deccanensis, Grah.		•••		412
tiliacous, Herb. Str. &			329	denticulata, Wall.	•••		.,	465
tiliaceus, Sm		"	331	dependens, Roxb.			,,	521
Treutleri, Hk. f		"	327	depressa, Wall		•••	••	410
triflorus, Ham		"	332	diffusa, Wall			••	424
triflorus, Richards		"	336	Digitalis, Koen.	•••	.1.	"	493
uncatus, Wall		"	337	divaricata, Wall.			,,	469
Wallichianus, W. & A		"	333	dorsiflora, Retz.	•••	•••	٠,	417
sp., Clarke		"	332		•••	•••	"	520
sp., Hk. f. & T		."	411	dulcis, Wall	•••	•••	"	422
Ruellia, Linn		iv.		dura, Nees	•••	•••	"	424
aciculata, Roth		473	507	ebracteolata, Dalz.	•••	•••	"	424
alata, Wall		471,		elegans, Hook.	•••	•••	"	410
anisophylla, Wall		i v .	462	erecta, Burm	•••	•••	"	424
arcuata, Wall		"	427	erecta, Ham	•••	•••	"	412
argentea, Wall aristata, Vahl		"	454	erecta, Roth	•••	•••	"	522
		"	521	fasciculata, Retz.	•••	•••	"	424
aspera, Nees		"	446	fasciculata, Wall.	•••	•••	,,	
atropurpurea, Wall	• •••	"	472	filiformis, Heyne	•••	•••	"	494
atroviridis, Wall	• •••	"	495	fimbriata, Wall.	•••	•••	"	447
attenuata, Wall		"	414	flaccida, Kurz	•••	••	"	424
auriculata, Wall	• • • • • • • • • • • • • • • • • • • •	"	453	flagelliformis, Roxb	••••	•••	"	411
balsamica, Linn. f		"	404	flava, Roxb	•••	•••	"	426
		"	408	flexuosa, Wall	•••	•••	"	460
		"	416	glabra, Heyne	•••	•••	"	414
		,,	418	? glabrata, Wall.	•••	•••	"	448
		"	423	? glandulosa, Roth	•••	•••	1)	414
Blumeana, Nees		"	423	glomerata, Wall.	•••	•••	"	448
bracteata, Heyne .		,,	413	glutinosa, Wall.	•••	•••	"	458
bracteata, Roxb		"	416	gossypina, Wall.	•	•••	"	428
		"	460	Griffithiana, Nees	•••	•••	19	425
		"	457	hirsuta, Roxb	•••	•••	>>	408
callosa, Wall		"	451	hirta, D. Don	•••	•••	"	454
calycina, Wall		"	469	hirta, Vahl	•••	•••	_ ,,	422
		"	428	imbricata, Vahl	•••	•••	",	417
capitata, Wall	iv.	459,		` incana, Heyne	•••	•••	"	408
Cephalotes, Wall		iv.	460	indigofera, Griff.	•••	•••	,,	468
		"	413	indigotica, Fortune		•••	"	468
cernua, Anders		"	413	infundibuliformis, 1			"	492
		,,	404	? involuorata, Vah		•••	"	414
cernua, Wall		,,	410	Jacquemontiana, N	209	•••	,,,	458
1 7 TET-11		"	494	Kunthiana, Wull.	•••	i٧.	434,	
ciliaris, Linn		"	479	lamiifolia, Wall.	• • •		iv.	463
ciliata, Hornem		"	413	latebrosa, Dalz. & G	ibs.		**	424
TT		"	437	latebrosa, Roth	•••	•••	"	424
111 / 377 - 11		"	440	latebrosa, Roxb.	•••	•••	"	423
111 127.33		"	465	leptostachya, Wall.		•••	5	542
•								

Ruellia		(Deallie	•	
littonalia Timm B	Vol. Page	Ruellia		Page
longifolia, T. Anders.	iv. 410	suffruticosa, Roxb	iv.	413
longifolia Dash	,, 412	tentaculata, Linn	,,	507
longifolia Dank	, 407	tomentosa, Wall	*** ,,	428
June John W 11	, 409	tristora, Nees	,,	404
Managana Wall	iv. 443, 444	triftora, Ronb	,,	405
macrosiphon, Kurz	iv. 495	uliginosa, Linn. f	,,	403
maculata Wall	, 413	uliginosa, Wall	,,	406
mallingium VI-t	,, 457	ulmifolia, Wall	,,	430
9 mondana 137-11	,, 408	undulata, Vahl	,,	408
man amount of the TIT 11	, 487	urens, Heyne	,,	428
mucronata, Wull	iv. 520, 521	urophylla, Wall.	,,	472
mysurensis, Roth	jv. 496	urticifolia, Wall	,,	464
Nagchana, Ham	, 410	varians, Vent	,,	418
Neesiana, Wall	, 496	venosa, Heyne	,,	423
obovata, Roxh	, 408	verticillata, Wall	,,	404
Panichanga, Wall	,, 473	Wightiana, Wall	,,	412
P paniculata, Heyne	,, • 409	zeylanica, Koen	,,	493
paniculata, Linn	,, 554	sp., T. Anders	,,,	413
patula, Jacq	,, 412	RUELLIEÆ	i▼.	388
pauciflora, Wall	,, 501	Rumez, Linn	V.	58
Pavala, Roxb	,, 421	Acetosa, Linn	,,	60
pectinata, Wall.	,, 447	Acetosella, Linn	,,	61
pentsemonoides, Wall.	,, 460	acutus, Roxb	,,	59
persica, Burm	,, 479	aquaticus, Linn	,,	59
persicifolia, Griff	,, 462	chinensis, Campd	,,	59
phlomoides, Wall	,, 408	comosus, Ham	,,	59
polysperma, Roth	,, 406	conglomeratus, Murr.	11	59
prostrata, Lamk	,, 411	dentatus, Linn	,,	59
? punctata, Nees	,, 442	dentatus, Wall	,,	59
quadrangularis, Heyne	,, 494	Dioscoridis, Heyne	••• ,,	58
quadrangularis, Wall.	,, 460	hamatus, Trev	,,	60
quadrifaria, Wall	,, 425	hastatus, D. Don	,,	6 0
quudrivalvis, Wall	,, 408	hastifolius, M. Bieb.	,,	60
racemosa, Heyne	,, 410	Klotzschianus, Meissn.	,,	59
racemosa, Roxb	" 401	maritimus, Linn	,,	5 9
radicans, Wall	,, 407	nepalensis, Spreng	,,	60
repens, Linn	,, 412	nigrioans, Hk. f	,,	59
	,, 412	obtusifolius, llam	,,	59
	iv. 412, 413	obtusifolius, Linn	,,	60
ringens, Roxb	iv. 412	orientalis, Bernh	,,	58
rivinæfolia, Wall	" 533	palustris, 8m	,,	59
	,, 463	Patientia, Linp	,,	59
	,, 475	peregrinus, Boiss	,,	60
	,, 430	pulcher, Linn	,,	60
rupestris, T. Anders.	,, 424	ramulosus, Meissn	,,	60
	,, 427	Roxburghianus, Schult.	f. ,,	60
	,, 454	Roxburghianus, Wall.	,,	59
salicifolia, Vahl	,, 407		,,	60
sarmentosa, Nees	" 423]		,,	59
satpoorensis, Wawra .	,, 424		,,	60
scabra, Wall is	7. 437, 446	uncinatus, Hort	,,	60
	iv. 520	vesicarius, Linn	,,	61
secunda, Vahl	, 493		,,	59
sesamoides, Wall. iv. 12	9, 435, 436	Wallichii, Moissn	"	59
spicata, Roth	iv. 435	. (1	,,	59
	,, 454	Rumicks	v.	2 2 ·
	,, 428	Darman Line Titura	ii.	44
•				

Rumphia	Vol.	Page	Rynchospora	٧ol.	Page
· · · • ·	ii.	44	Griffithii, Boeck	,	67 z
4*1* # 1* # 1	,,	44	Hænkei, Presl	٠,,	663
Rungia, Nees	i⊽.	545	Hookeri, Boeck		671
apiculata, Bedd	,,	548	Kamphæveneri, Boeck		671
A	,,	546	Kysoor, Dietr		66)
D-33 (111-	,,	549	lavarum, Hook. & Arn		672
D 1:-!! Oll.	,,	549	lana, Br		671
	,,	547	lava, Thw		672
elegans, Dalz. & Gibs	,, ,,	549	longisetis, Br		669
f 1.1 1	,,	518	malusica, Clarke	,	670
laboratorio M. Analana	,,	548	? mollis, Wall	,	672
	,,	546	Prescottiana, Wail	,,,	669
læta, Clarke	,,	546	ruppioides, Benth	,,,	654
latior, Nees & T. Ander	F. ,,	547	sikkimensis, Clarke	,,,	672
12 - 2C-12- 3T	. ,,	548	triflora, Vahl	, ,,	670
	,,	547	Wallichiana, Kunth		668
longifolia, T. Anders	,,	547	Wightians, Steud	٠,,	669
longifolia, Bedd	,,	5 50	zeylanica, Thw	,,	670
Mastersi, T. Anders	,,	55 0	sp, Wall vi. 6)5, 668	, 670	, 67 L
muralis, Nees	,,	550	RYNCHOSPOREE	vi.	586
origanoides, Nees	,,	550			
parviflora, Nees	,,	550	Sabia, Coleb	ii.	1
	,,	550	campanulate, Wall	, ,,	1
	,,	559	? floribunda, Miq		5
punduana, Nees	,,	527	lanceolata, Coleb	, ,,	2
repens, Nees	,,	549	leptandra, Hk . f . & T	, ,,	2
	,,	550	limoniaces, Wall		3
	,,	546	malabarica, Bedd	, ,,	. 2
stolonifera, Clarke	,,	547	Meniscosta, Bl	. ,,	3
Wightiana, Nees	,.	546	paniculate, Edgew	, ,	3
	v. 547	7, 518	parviflora, Wall	, ,,	2
Ruppia, Linn	vi.	568	parviflora, Wall	. ,,	2
maritima, Griff	,,	568	purparea, Hk. f. & T		2
	,,	568	tomentosa, Hk. f	. ,,	3
subsessilis, Thw	,,	567	viridissima, Kurz	٠,	8
Rota, Linn	. i.	485	SABIACEÆ	ji.	1
albiflora, Hook	,,	486	Sacobarum, Linn	vii.	118
angustifolia, Pers	,,	485	aezyptiacum, Willd	. ,,	119
chalepensis, Wall	,,	485	Alopecurus, Neos	. ,,	107
graveolens, Linn	,,	485	arundinaceum, Retz	. ,,	119
japonica, Sieb	,,	486	bengale se, Ham	, ,,	119
tuberculata, Forsk	,,	495	? benghalense, Retz	,,	119
sp. Aitch	,,	496	biflorum, Forsk	, ,,	119
RUTACEÆ	<u>i</u> .	484	Boga, Ham	. ,,	119
Rutez	i,	484	brevifolium, Haw	. ,,	98
Ryckia furcata, De Vriese.	Vi		brunneum, Desv	. ,,	121
	vi.		caducum, Tausch	. ,,	119
	,,	649	canaliculatum, Roxb	. 22.	119
	,,	670	Casi, Ham	. ,,	119
	,,	670	caudatum, Mey	. ,,	107
	,,	670	chinense, Noos	. ,,	119
	,,	672	ciliare, Anders	. ,,	119
	,,	671	confertum, Presi	. ,,	107
	,,	671	contractum, H. B. K	. ,,	107
glanca, Bosck	,,	672	cylindricum, Lamk	•	106
	,,	671	diandrum, Koen	•	106
gracillima, Thw	,,	671	dubium, H. B. K	. ,.	107

				•		•	
Saccharum	Vol.	Page	Saccolabium		V	ol.	Page
europæum, Pers	∀ii.	106	bellinum, Rchb. f.	•••	• • •	₹i.	61
evaltatum, Roxb	,,	119	Berkeleyi, Rohb. f.		• • • •	,,	28
fallar, Balans	"	1.5	bigibbum, Rchb. f.			"	61
fastigiatum, Steud	"	125	bipunctatum, Par. &				73
ft ifolium, Steud	,,	124	■ T01	•••		"	23
American Deal		120	brevifolium, Lindl.		•••		57
/11 D	••	119	buccosam, Rchb. f.			"	58
0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	120,				•••	641	197
			calceolare, Lindl.	•••			61
hirsutum, Forsk			calceolare, Paxt.	• • •	1	71.	-
indum, Pers	"	106	carinatum, Griff.	•••	•••	"	63 9
insulare, Brongn	"	119	Cephalotes, Hk. f.	•••	•••	"	63
P jaculatorium, Lour	,,	107	clavatum, Lindl.	•••	vi.	66,	197
jamaicense, Trip	,,	121	congestum, Hk. f.	• • •		٧i.	63
Klaga, Jungh	,,	119	curvifolium, Lindl.	•••		,,	65
Koenigii, Retz	,,	106	dasypogon, Lindl.			,,	66
laguroides, Pourr	"	106	densiforum, Lindl.		•••	,,	72
Lola, Hâm	".	119	denticulatum, Paxt.		•••	,,	61
Lola, Hâm longifolium, Munro		125	discolor, Robb. f.				56
macilentum, Chauv	,,	107	distichum, Lind/.	•••		"	64
A 8 . 21 . T 2		120	filiforme, Lindl.		•••	"	5;
	"	119			•••	"	58
Moonja, Royle	"	119	flavum, Hk. f	•••		"	72
Munja, Roxb			flexuosum, Lindl.	:::	···	"	
Narenga, Ham	"	120	fragians, Par. & Ro		J.	"	58
negrosense, Staud	"	107	galealum, Gardn.	•••	•••	"	71
officinarum, Linn	,,	118	garualicum, Linol.		•••	"	82
Palisotii, Tausch	**	119	gemmatum, Lindl.	(lap			
paniceum, Lamk	"	14l	gominatum)	•••	τi.	53,	197
procerum, Roxb	,,	119	gijanteum, Lindl.			¥1.	53
propinguum, Steud	"	119	gracile, Lindl			,,	67
zunclatum, Sohum	"	119	Griffithii, Par. & Re		f.	٠,	77
Ravennæ, Bieb	"	103	guttatum, Lindl.			,,	32
Ravennæ, Murr		121		•••		"	32
Ridleyi, Hack	"	120					57
	"	123	? inconspicuum, H			"	56
	"	112	intermedium, Griff			"	61
rufum, Steud	"	122	Jerdonianum, Relib		•••	"	59
Sara, Ai ch	**			-	•••	"	60
Sara, Roxb		119	lanatum, Hk. f.	•••	•••	"	
semidecumbens, Roxb	"	119		•••	•••	"	47
sinense, Roxb	"	118	1	• • •	•••	"	62
speciosissimum, Tausch	,,	119		•••	٠	.".	33
spicatum, Barm	"	106	longifolium, Hk. f.		٧ı.		197
spicatum, Linn	,,	98	maculatum, Hk. f.		•••	٧ì.	64
spontaneum, Lins	,,	118	micrauthum, Lindl.	•••	•••	,,	59
spontaneum, Liuu	,,	119	miniatum, Hook.		•••	"	K5
Surpata, Ham	11	1.9	minimiflorum, Hk.	f.	•••	"	59
Teneriffa, Linn. f		65	nilagirioum, Hk. f.	•••		"	60
Teneriffæ, Parl	"	65	niveum, Lindl		•••	,,	55
tennuis, Ham		119		•••	•••	"	61
tridentatum, Spreng	•••	149	obtusifolium, Hk. f.			"	45
tristach sum Stand		118	ochracenm, Lindl.				62
tristachyum, Steud			pallens, Lindl.			"	65
sp., Wall vii. 119,	E4	174	manieulatum Winha	•••	•••	"	47
	. 54,		paniculatum, Wight	•••	•••	"	68
	₹i.	61	papillosum, Lindl.		•••	"	62
acumiuatum, Rk. f	**	65	papillosum, Dals. &	GIE		"	
acuminatum, Thw	,,	67	papillosum, Wight		•••	"	68
acutifolium, Lindl	"	61	parvulum, Lindl.	•••	•••	**	58
ampullaceum, Lindl	"	64	Pechéi, Rchb. f.	•••	•••	"	66

110	G E	MEMAL	IRDEA.	•	•	
Saccolabium .	Val	Page	Sagittaria		Val	Page
penangianum, Hk. f	V		Lappula, D. Don		vi.	561
perpusillum, $Hk. f$		56	. 1 f (. 16. 1) - T 1		,,	560
præmorsum, Hk. f		62	77 777 71		"	561
præmorsum, Lindl		32	sugittifolia, Linn		"	561
Pumilio, Rehb. f	,,	56"	triandra, Dalz		"	562
pusillum, Lindl		57	Sagotia triflora, Wal	p. &c	••	
racemiferum, Lindl	,,	68	Duch		ii.	173
ramosum, Lindl	. ,,	72	Saguerus Langkab, Bl.	•••	vi.	421
reflexum, Lindl	"	49	Rumphii, Boxb	• •••	"	421
retusum, Hort	,,	32	sacchurifer, Wurmb.	•••	"	421
Rheedii, Wight	"	32	Sagus farinifera, Gwrta	•	Vi.	481
ringens, Lindl	,,	46	genuina, Bl inermis, Roxb		,,	481
roseum, Lindl	"	58 59	9 77	• •••	"	481 481
rostellatum, Hk. f	"	65	? Kænigi, Griff		"	48l
rubrum, Lindl	"	46	lævis, Rumph		"	481
rubrum, Wight	"	45	m 1.22 Willia	1	"	481
speciosum, Wight ? tenerum, Lindl	"	73	P Saivala vallisnerioides		. Y.	661
tenuicaule, Hk. f	"	64	sp., Jones		, ,,	661
trichromum, Rchb. f	"	65	Sajorium corniculatum,	Baill.	Ÿ.	464
undulatum, Liudl	,,	74	Salacia, Linn		i.	625
virescens, Gardn	,,	57	Brunoniana, W. & A	l	,,	626
viridiflorum, Lindl	,,	63	P chinensis, Linn		"	627
Walkerianum, Rehb. f.			P cochinchinensis, Lou	ır	"	627
(lapsu Sarcanthus)	",	58	densistora, Wall		,,	629
	. 62	, 197	diandra, Thw		"	627
Wightianum, Lindl	Vi.	46	Finlaysonii, Wall flavescens, Kurz		"	627
sp. Griff	,,	61	flavescens, Kurz		"	625
Saccopetalum, Benn	1.	88	floribunda, Wight		"	629
lougiflorum, Hk. f. & T	, ,,	88	frutioosa, Heyne		"	628 626
? sclerocarpum, Hk. f. S. T	• **	88	grandiflora, Kurz		"	628
tomentosum, Hk. f. & T.	. ;"	88 645	Griffithii, Laws læviyata, Wight		"	624
Sælanthus quadragonus, Forsk Sageræa Dalzellii, Bedd	i.	93	latifolia, Wall		17	629
elliptica, Hk. f. & T.		92	Lobbii, Laws		"	626
Institute Dolo	"	93	longifolia, //k. f		"	626
Thwaitesii, Hk. f. & T	"	92	longifolia, Wull		"	629
Sageretia, Brongn	i.	641	macrosperma, Wight		,,	628
Brandrethiana, Aitch	,,	642	Maingayi, Laws		"	626
corymbosa, G. Don	"	642	membranacea, Laws.		"	627
filiformis, G. Don	"	641	memecyloides, Wall		17	628
hamosa, Brongn	,,	641	multiflors, Wight		"	627
oppositifolia, Brongn	,,	641	oblonga, Wall		12	628
theezans, Brongn	,,	641	oppositifolia, Rottl	•	,,	628
theezans, Brandis	,,	642	ovalis, Laws	• •••	"	627
sp. Wall	,,	641	paniculata, Wall	• •••	"	624
Sagina, Linn	i.	242	podopetala, Turcz		"	626
ammannicides, Wall	"	251	ponisera, W. & A		"	629
Linnæi, Presl	,,	243	pomisera, Wall		"	628 626
procumbens, Lian	"	242	princides, DC		"	627
saxatilis, Wimmer	"	243 561	reticulata, Wight Roxburghii, Wall		"	627
Sagittaria, Linn ,	٧ì.	561			77	627
cordifolia, Roxb Doniana, Sweet	"	561	terminalis, Thw		. "	624
guayanensis, H.B.K	"	561	verrucosa, Wight		"	628
hastata, D. Don	"	561	? viminea, Wall		"	627
hermaphrodita, Ham	"	561	Wightiana, Wall		"	626
	**	•	•			

			• •
•	Vol.	Page	Salix Vol. Page
Salicineæ	. v.	626	obovata, Wall v. 634
Salicornia, Linv	. v.	12	obsourn, Anderss v. 632, 637
brachiata, Rorb	. ,,	12	octandra, Del v. 628
herbacea, Linn	,,,	13	oreophila, <i>II k. f.</i> ,, 635
indica, Willd	. ,,	12	oxycarpa, Anderss ,, 636
SALICORNIEÆ		2	pondicheriana, Anderss " 628
Salix, Linn	٧.	626	Pscudo-grisea, Steud " 629
acmophylla, Boiss	, ,,	628	psilostiyma, Anderes ,, 633
acmophylla, Anderss	. ,,	628	purpurea, Linn ,, 636
acutifolia, Willd		631	pycnosiachya, Anderss , 638
alba, Linn		629	pyrina, Lindl ,, 627
angustifolia, Willd		636	repens, Linn ,, 630
apiculata, Anderss		627	retusa, Liun ,, 635
? Arbuscula, Hk. f. & T		631	rotundifolia, Roylo ,, 634
babylonica, Linn		629	solorophylla, Anderss ,, 630
cæsia, Vill	•••	637	secta, Hk. f ,, 635
.calophylla, Wall		628	sericocarpa, Anderss ,, 637
calostachya, Anderse	• • • • • • • • • • • • • • • • • • • •	637	Serpyllum, Anderss ,, 634
calyculata, Hk. f		635	sikkimonsis, Anderss ,, 632
Capres, Linn	•	629	Comithiana Willed 829
-14- W/-11		635	augualana Andaren (297
cuspidata, Wall		627	Sufund Bands Cop
Daltoniana, Anderss		632	Annual Carl Cont
3 t 23 17/11		631	Whompuniana Andrusa (695
.7 18711		628	
7 4 1 A . 3		630	
		627	001
disperma, D. Don		637	Wallishians Andress (298
divergens, Anderss		630	7 F 22 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
elogans, Wall			
eriophylla, Anderss		633	, , , , , , , , , , , , , , , , , , , ,
eriostachys, Wall		633	
flabellaris, Anderss	. ,,	634	sp., Str. & Wint. v. 628, 630, 634 Salmalia malabarica, Schott. i. 349
fragilis, Linn	. ,,	630	
fruticuloss, Anderss	. ,,	637	Salomonia, Lour i. 206
glabrata, Heyne	• ,,	473	? angulata, Griff ,, 207
glabrescens, Lindl	• ,,	627	aphylla, Griff ,, 207
glauca, Anderss	. ,,	628	c.marana, Hassk ,, 207
Govaniana, Wall	. ,,	630	cantoniensis, Lour ,, 206
grisea, Wall	. ,,	629	oiliats, DC ,, 206
hastuta, Linn	. ,,	630	cordata, Arn , 206
himalensis, Klotz	. ,,	630	edentula, DC ,, 207
Horrfieldiana, Miq	. ,,	627	? Horneri, Hassk ,, 207
Hujelii, Wimmer		627	leptostachya, Wall ,, 207
ichnostachya, Lindl		628	oblongifolia, DC , 207
insignis, Anderes		631	obovata, Wight " 207
kumaonensis, Linul		630	parasitica, Griff ,, 207
lenta, Fries		627	petiolata, Ham ,, 207
Lindleyans, Wall		634	? rigida, Hassk ,, 207
longiflora, Anderss	•••	633	sessilistora, Ham ,, 207
longipes, Hk. f. & T		634	? setoso-ciliata, Hassk , 207
lucida, Jacq		634	? stricta, Sieb. & Zucc " 207
myricofolia, Anderss		637	subrotun la, Hassk ,, 206
7.		634	tenella, Ilk. f ,, 207
		637	? uncinata, Hassk ,, 207
		627	sp., Griff ,, 206
Myurus, Wimmer		627	Salsola, Linn v. 17
nilagirica, Miq		628	cinerea, Waldst. & Kit , 10
nobilis, Fries	. ,,	040	1

'					
Salsola		Vol.	Page	Salvia - Vol.	Page
collina, C. A. Mey		₹.	Ĭ7	indica, Linn iv.	
dendroides, Pall			18		07.4
	•••	"		The second secon	
elata, Wight	•••	"	14	japonica, Thunb "	655
fostida, Del	•••	"	18	l lanata, Rosb ,,	654
fruticosa, Linn		,,	13	lyrata, Boxb "	656
P fruticosa, Wall	•••		14	massanhaille Domeh	653
		"	18	I minutifican Danas	656
	•••	"			
indica, Royle	•••	"	18	Moorcroftiana, Wall ,,	654
indica, Wall	•••	,,	13	nubicola, Benth ,,	653
' indica, Willd	•••	"	14	ocimoides, Roxb ,,	656
P Jacquemontii, Moq.			17	0	655
		"	17		655
	•••	**	13	plebeia, Br ,,	
Lana, Edgew	•••	"		plectranthoides, Griff "	655
Lana, Stocks	•••	"	15	pratensis, Linn "	655
Marosteum, Moq		"	18	pumila, Benth ,,	656
Moorcroftiana, Ŵall.	•••		18	santolinæfolia, Boiss,	656
3:0 317-11		"	14	anningle Wall	655
nuayiora, Wall	•••	"		Calima minus Washes	653
nudiflora, Willd	•••	"	14	Schimperiana, Hochst ,,	
prostrata, Linn	•••	"	10	Samadera, Gærtn i.	518
recurva, Wall		,,	15	indica, Gærtn ,,	519
salsa, Jacq	•••		14	lucida, Wall ,,	519
4.4		"	14	Samara floribunda, Kurz iii. 513	
	•••	"			
sedoides, Pall	•••	**	10	frondosa, King iii.	
spinescens, Wight	•••	"	18	læta, Moon ii.	564
Stocksii, Boiss		"	15	microcalyx, Kurz iii.	513
tamariscina, Pall			18	Myrtillus, Kurz ,,	516
		"	18		515
verrucosa, M. Bieb.	•••	"		1 0 187_11	515
SALSOLEÆ	•••	▼.	. 2	? picta, Wall ,,	
Salvadora, Linn	•••	iii.	619	Rheedii, Wight ,,	516
indica, Royle		"	620	Ribes, Kurz "	513
indica, Wight		"	619	robusta, Kurz ,,	515
			620	1:0 V	513
	•••	"	620		517
òleoides, Done	•••	"		vestita, Kurz "	
oleoides, Wall	•••	"	620	viridiflora, Thw ,,	516
persica, Linn		"	619	Samaropysis elliptica, Miq. v.	377
persica, T. And	•••	"	620	Sambuceæ iii.	1
persica, Wall		í.	582	Sambuous, Linn iii.	2
	•••				3
Stocksii, Wight	•••	iii.	620	adnata, Wall ,,	
Wightiana, Planch	•••	"	619	chinensis, Lindl "	2
sp., Wall	•••	"	62 0	Ebulus, Linn ,,	2
SALVADOBACEÆ		iii.	618	javanica, Bl ,,	2
Salvia, Linn	•••	iv.	653	rubra, Ham ,,	2
			653	mi	2
	•••	"			748
acaulis, Vahl	•••	"	656		-
mgyptiaca, Linn.	•••	"	656	Wightianus, Wall iii.	2
asperata, Falc		,,	654	`sp., Griff ,,	2
bengalensis, Roxb		"	653	Samoles iii.	482
brachiata, Roxb			655	Samolus, Tournef iii.	506
	•••	"		' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	506
brachycalyx, Boiss	•••	"	656	Valerandi, Linn ,,	598
campanulata, Wall	•••	"	654	Samyda Piscidia, Ham ii.	
cana, Wall	•••	"	654	Samydaceæ ii.	590
coccinea, Linn		"	656	Sandalum album, Rumph v.	231
dianthera, Roth			653	Sandoricum, Cav i.	553
		"	655	1 Win	554
	•••	"		borneense, Miq "	553
	•••	"	656	emarginatum, Hiern "	
	•••	"	653	glaberrimum, Hassk "	558
hians, Royle	•••	"	653	indicum, Cav "	553
				· · · · · · · · · · · · · · · · · · ·	

			_ •	
San Corioum	Vol.	Page	Sapindus Vol. Pag	•
Maingayi, Hiera	i.	554	deficiens, W. & A i. 671, 681	
nervosum, Bl	. ,,	553	detergens, Roxb i. 683	
serratum, G. Don		553	detergens, Wall 681	5
ternatum, Blanco		553	edulis, Ait i. 635, 687	7
Sanguisorba diandri, Wall.	ii.	362	edulis. Bl ,, 672, 698	
longifolia, Bertol		863	emarginata, Vahl i. 681	2
Sanicula, Linn	• •	670	erectus, Hiern i. 633, 690	
eiata, Ham		670	frazinifolius, DC , 672, 681	
europea, Linn		670	fruticosus, Roxb , 680, 69	
L 1:4- TT		670	00000	
		670		
mandana Dalam		670		
G				
Sansevieria, Thunb		270 327	indica, Poir i. 685	
fruticosa, Bl			laurifolia, Vahl 1. 682, 685	
Roxburghians, Schu't	"	271	lepidotus, Wall ,, 556. 685	
zeylanica, Willd	-	270	longifolius, Ham ,, 672, 635	
zeylanica, Roxb		271	longifolia, Vahl i. 695	
SANTALACEÆ		228	microcarpus, W. & A. i. 685, ii. 6	
Santalum, Linn	٧.	231	mollis, Bl i. 685	
album, Linn	"	231	monogyna, Herb. Heyne i. 685, 689	
myrtifolium, Roxb	"	231	Mukorossi, <i>Gærtn.</i> ,, 683, 635	
verum, Linn	"	231	multijugus, Wall ,, 552, 685	Ď
Santia, W. & A	iii.	191	obovatus, W. & A i. 685	5
venulosa, W. & A	"	191	pinnatus, Mill i. 672, 635	í
Santia, Savi		2!6	pinnatus, Roxb ,, 672, 695	í
elongata, Parlat	,,	246	polyphyllus, Roxb i. 685	6
Santiria, Bl	ï,	536	Rarak, DC i. 672, 685	
apiculata, A. W. Benn	"	537	rubiginosa, Roxb ,, 672, 685	
conferta, A. W. Benn	"	537	Saponaria, Herb. Linn i. 695	
costata, A. W. Benn		537	Saponaria, Lour i. 672, 685	
fasciculata, A. W. Benn.	"	539	squamosus, Roxb ,, 676, 695	
		538	tetraphylla, Vahl , 671, 685	
3.6 · · · / 177 m	"	538	Thwaitesii, Hiern ,, 6.3, 691	
	77	538	travancorensis, Wall. ,, 532, 685	
multiflora, A. W. Benn	"	536	trifoliatus, Linn , 632, 685	
Planchonii, A. W. Benn.	"	537		
puberula, A. W. Benn	"		undulatus, Wall 1. 680 unijugus, Thw i. 682, 635	
tomentosa, Bl	**	538		
virgata, Bl	**	539	Sapium, P. Br v. 469	
virgata, Bl Sapindacea, Br	00.	680	baccatum, Roxb ,, 470 Bingirium, Roxb 471	
	677,		cordifolium, Roxb ,, 421	
SAPINDACEZ		668	Daidece, Hum ,, 470	
SAPINDEZE	i.	668	discolor, Muell ,, 469	
Sapindus, Plum	i.	682	euzeniæfolium, Ha u ,, 470	
abruptus, Lour	"	683	hexandrum, Ham ,, 470	
abstergens, Roxb	,,	682	Hookeri, Herb. Calc ,, 470	
acuminatus, Wall	"	684	Hurmais, Ham ,, 471	
acutus, Roxb	"	682	indioum, Willd ,, 471	
acutus, Wall	,,	695	insigne, Benth ,, 471	
adenophyllus, Wall i.	677,	685	populifolium, Wall ,, 470	
alternifolius. Ham	672,	685	sebiferum, Roxb ,, 470	
angustifolius, Wall	i.	685	sterculiacum, Wall " 372	
attenuatus, Wall. i. 684,	690 .	691	virgatum, Benth ,, 471	,
	685,		Saponaria, Linn i. 217	1
	684,		oxyodonta, Boiss ,, 217	•
	671,		perfoliuta, Roxb " 217	
Danura, Voight i. 684,	690	691	Vaccaria, Boiss ,, 217	
Danura, rosynt 1. 001)	JJV)	30 I	,	

Saponaria	V ol.	Page	Sarcanthus	۲	ol. I	Page
** 1. * 1 .	i.	217	teretifolius, Rohb. f		vi.	67
	iii.	534	tricolor, Rehb. f	•••	,,	68
	,,	538	Walkerianus, Wight	•••	,,	58
tomentosa, A. DC	,,	538	Williamsoni, Rchb. f.	•••	"	67
SAPOTACEÆ	iiı.	534	Sarcocephalus, Afzel	•••	iii.	22
Sapotea, Griff:	iii.	536	Cadamba, Kurz	•••	"	23
Sapria, <i>Griff</i>	v .	71	cordatus, Miq	•••	,,	22
	,,	71	Horsfieldii, Miq		"	22
	!!	71	Junghuhnii, Mig	•••	,,	23
£aprosma, Bl	iii.	192	subditus, Miq	٠٠٠.	,.	22
	,, .	193	Sarcochilus, Br		33,	
	,,	192	amplexicaulis, Rohb. f.	•••	V 1.	40
	,,	194	Arachnites, Rchb. f	•••	"	41
	,,	193	aureus, Hk. f	•••	"	35
70-7	,,	192 192	Berkeleyi, Rchb. f	•••	"	37 34
	,,	193	brachyglottis, Hk. f.	••• ,		41
	•• ,,	193	brachystachys, Hk. f.	•••	"	35
	;;	271	cladostachys, Hk. f	••••	"i,	
., 7)	11.	271	complanatus, Hk. f.	VI.	91,	196
110 70-1	,,	272	filiformie, Hk. f hirsutus, Hk. f	"	ວອ, ⊶:	38
Jaslinaka Mia	,,	272			vi.	39
·	,,	271	1	•••	"	35
Tables Dakes	,,	272		•••	"	38
	"	272	leopardinus, Par. & Rchl		"	38
	,,	271	l 999 "	-	"	40
369	,,	272	luniforus, Griff	•••	"	37
	,,	272	maculatus, Bench	•••	"	64
77 11: 'r 34:	•• ,,	271	1 36	•••	"	36
Sarcandra chloranthoides,	,,	-11	merguensis, Hk. f merguensis, Hk. f		in.	196
^i	▼.	100	minimifolius, Hk. f.		vi.	37
	vi. 66,		muriculatus, Rchb. f.	•••	,,	34
31 3 . 777 6	vi.	67	nepalensis, Spreng		"	60
~ ~ ~ ~ ~ ~ ~ ~ ~ ~	,,	70	notabilis, Hk. f		"	42
Dall C	,,	70	obtusus, Benth	•••	"	36
	,,	70	pauciflorus, Hk. f	•••	"	41
densiflorus, Par. & Rohb.		72	præmorsus, Spreng	•••	"	63
	,,	69	pugionifolius, Hk. f.		"	196
A11A 1 T. 37	,,	66	pulchellus, Trim	•••	"	39
67'6	,,	56	purpureus, Benth	••	"	36
guttatus, Lindl	,,	32	recurvus, Hk. f	•••	"	39
	,,	68	Rozburghii, Hk. f	•••	"	36
	,,	69	Scopa, Rchb. f	•••	"	40
lorifolius, Par	,,	69	Scortechini, Hk. f	•••	,,	40
macrodon, Rchb. f	,,	70	serræformis, Kchb. f.	•••	"	41
mirabilis, Rchb. f	vi. 58		Sillemianus, Rchb. f.	•••	"	42
	vi.	70	stenoglottis, Hk. f	•••	,,	34
	,,	68	suaveolens, Hk. f	•••	"	33
	,, .	69	trichoglo tis, Hk. j	•••.	"	39
	,,	67	Trimeni, Hk. f			196
	,,	67	usneoider, <i>Kcro. J. ,</i>	···.	VÍ.	37
	,,	70	viridiflorus, Hk. f	₹ì.	33,	196
racemifer, Robb. f	,,	68	Wightii, Hk. f	"	57,	198
	,,	56 ce	Sarcochlamys, Gaud			588
Scortechinii, Hk. f	,,	68	pulcherrima, Gaud		**	588
secundus, Griff	•• ,,	67 60	Sarcoclinium Gaudichau	-	_	400
Stowellianus, Batem	•• ,,	69	Baill	•••	▼.	406

			• • •	
Saroclinium	Vol. 1		Val. Page	
	♥.	407	SATUREINEE iv. 603	
	,,	407	Satyrium, Sw vi. 168	
Sarcococca, Lindl	V.	266	albistorum, A. Rich " 168	
brevifolia, Muell	,,	267	Epipogium, Linn ,, 124	
Hookeriana, Baill	,,	267	foliosum, Heyne ,, 160)
	,,	266	nepaleuse, $D. D \circ n \ldots , 168$	3
·	,,	267	pallidum, A. Rich " 168	3
	,,	266	Perrottetianum, A. Rich. " 168	3
saligna, Muell	v. 266,	267	repens, Linn vi. 95, 112	2
	▼.	266	Wightianum, Lindl vi. 169	
		266	Sauranja, Willd i. 286	_
	,,	267	0.00	
	•• **	20,	1.4. UP:-L4 901	
Sarcodiscus chloranthiformis	*	114		
	v .	27	1000100100100101	-
	iv.		, , , , , , , , , , , , , , , , , , , ,	
	,,	28	1 17 V 1 90°	
	,,	27	72	
globosus, Wall	,,	27	macrotricha, Kurz ,, 28'	
	,,	28	media, Korth ,, 28	
Sarcopodium affine, Lindl.	▼.	756	micrantha, Griff , 280	
amplum, Lindl	,,	712	napaulensis, DC i. 286, 490	
	,,	712	paniculata, Wall i. 280	5
`~ . ~	,,	756	punduana, Wall " 28	7
	••• ,,	756	Rozburghii, Wall ,, 28	7
	,,	755	sterculifolia, Griff ,, 28	8
		754	tristyla, DC: ,, 28	7
		754	SAURAUJEE i. 279	9
	••• ,,	754	Sauromatum, Schott vi. 50	8
psittacoglossum, Rchb. f.		754	guttatum, Schott ,, 50	8
	••• ,,	755	1 1 1 1 EO	
	,,	755	Peacett, 2017 1 " FO	
	"	540	77- 11	
	11.		(000000900010000)	
grandiflora, Griff	• 17	541	manacetone, Series et	
grandiflora, Griff lanceolata, Wall	••• ,•	541	000000000000000000000000000000000000000	
	,;	541	Duniopas, and in the	
Sarcosperma, Hk. f	iii.	535	albicans, Bl ,, 33	
	,,	535	assimilis, Thiv ,, 33	
	,,	536	brevipes, Muell ,, 33	
	iv.	26	Ceratogynum, Baill ,, 38	_
annulare, Roth	,,	21	compressus, Muell ,, 33	
brachystigma, Hook.	;	27	forcipatus, Hk. f ,, 33	4
brevistigms, W. & A.	,,	26	Gardnerianus, Wight ,, 33	2
Brunonianum, W. & A.		27	indicus, Wight " 33	2
		27	lanceolatus, Hk. f ,, 33	13
intermedium, Dene.	••• , "	64	macrophyllus, Hk. f ,, 33	3
pyroco	,,	27	oblongifolius, Hk. f ,, 38	13
	,,	27	pubescens, Hk. f ,, 33	15
viminale, W. & A	;"	594	1 dura mula man Marall 99	15
Sarcostigma, W. & A	1.	594	93	
	19		Separate Michigan	
Kleinii, W. & A	••• **	594	100101010000, 11 19111 111 111	
Wallichii, Baill	••• ,,	594	1191446, 21141	
Sarcostiama eglandulosun	١,		Bulpitabula, Editory	34
Wall	v.	342		
Saribus cochinchinensis,	Bl. vi		zeylanicus, Wight ,, 3	
Namicous ancers (TEPTI).	111		SAURUREE V.	78
Queneauthera lassopetaid. I	hw. i.		Daniel at the state of the stat	64
Sassafras Parthenosylon, N	005 V	, 136	Saussures, DC iii. 8	63
Dussujtus I ar encisca grony I			•	

'76	GI	NERAL	INDEX. /	
laussurea	Vol.	Page	Vol. Pag	70
acanthocarpa, Schultz	iii.	878	Savia Actophila, Hassk v. 28	
acaulis, Klatt		867	raulaniaa Baill 99	3
affinis, Spreng		878	Saxifraga, Linn ii. 39	0
albescens, Hk , f. & T		374	adoxoides, Griff 40	1
Andersoni, Clarke		370''	aristulata, Hk. f. & T ,, 39	2
Atkinsoni, Cla ke		367	asarifolia. Sternb ,, 39	
bracteata, Done	,,,	866	aspera, Willd " 39	7
brahuica, Boiss	"	373	aurea, Jacq ,, 39	7
cæspitosa, Wall. '	,,,	869	brachypoda, $D. Don \dots$, 39	-
candicans, Clarke	,,,	378	Brunoniana, Wall " 39	-
Candolleans, Wall	, ,,	872	Brunonis, Wull ,, 39	
Candolleana, Clarko	* **	372	cornus, Linn ,, 39	
ceratocarpa, Done	"	378	ciliata, Royle ,, 39	_
P chenopodifolia, Klatt	"	874	cordigers, Hk f. & T ,, 39	_
Clarkei, Hk. f	"	372	corymbo: Hk . f . F . T , 39	-
conica, Clarke	- 11	866	diapensoides, Karz ,, 39	
deltoides, Clarke	"	374	diversifolis, Wall ,, 39 avolvuloides, Wall ,, 39	
denticulata, Wall	"	375	evolvuloides, Wall ,, 89	_
elliptica, Clarke	"	372	filicaulis, Wall ,, 39	
eriostemon, Wall	"	370	fimbriata, Wall ,, 39	
Falconeri, Hk. f	. ,,	369	flagellarie, Willd ,, 39	
foliosa, Hk. f		873	glandulisera, Jacquem , 39	_
	• • •	, 371	glandulosa, Wall ,, 39	
gossypina, Wall	ii i .	376	granulata, Linn ,, 89	-
gosaypiphora, D. Don	"	376	hemisphærica, Hk. f. & T. , 39	
gossypiphora, Wall	,,	876	hirculoides. Done ,, 39	
graminifolia, Wall	•••	370	Hiroulus, Linn ,, 39	-
hieraciondes, Hk. f	"	371	hispidul, D. Don ,, 39	
Hookeri, Clarke	•••	371	Hoffmeisteri, Klotz ,, 39	
hypoleuca, Spreng		374	imbricate, Royle ,, 39	
Jacon, Clarke		375 369	Jacquemontiaus, Done , 39 latiflors, Hk. f. & T 39	
Kunthiana, Clarke			limplete Wall "90	_
Lappa, Clarke	•••	376 365	ligulata, Wall ,, 39 Lychnitis, Hk. f. & T ,, 39	
obvallata, Wall	•••	7.00	1	
orata, Benth		372 375	· · · · · · · · · · · · · · · · · · ·	
peguensis, Clarke		872		_
piptathera, Edgew		369		
polystichoides, Hk. f		372	marananalala Parla 90	_
pterocaulon, Done Roylei, Clarke	•••	370	maranatifalia Duli 90	
and Plane	•••	376	· · · · · · · · · · · · · · · · · · ·	-
0 (1-1 1 1 - 1 - 1 - 1 - 1 - 1 - 1 -	••	366	odontonbella Ul f & T 20	-
Galanianii III. C	•••	366	adamtanhailla Wall 90	
andifalia Minda		367	annonitifalia / imm	
sorocephala, Hk. f. & T		377	omiontolia logunum 90	-
9 -4	••	378	mallida Wall 90	-
Da liambul Olimbu	•••	368	malmahwata 1/1, f (, T) 90	
	••	367	manu antifolia Wall 90	
	•••	367	mammuilla Üli i li T	
Quality Olamba	•	368	milifora HL f & T 90	
A 1 - 10 - 11 . T27 . 11		368	THE PARTY OF THE P	-
Mh		366	nadžanas Tananas 000	
		377	mammalaga Wall 90	•
10 777 11		366	encincides Uh f h m 90	
uniflora, Wall uniflora, Clarke		370	national Doroh 90	1
wernerioides, Schultz		367	aibirles Time 90	
Yakla, Clarke	•••	368	othinian Time 90	
	27	500 1	MUTTER, 12111 ,, 39	•

Da ulfus ma		_				
Saxifraga		Page	Schedonorus			Page
Stella-aurea, Hk. f. & T	11.	395			▼11.	858
stenophylla, Royle	**	397	bromoides, W. & A.	•••	"	358
Střacheyi, Hk. f. & T	"	398	inermis, Beauv		"	357
strigosa, Wall	,	393	modestus, Nees		"	354
umbellulata, Hk. f. & T	"	395	serotinus, Rostrup		"	358
viscidula, Hk. f. & T	"	391	transparens, Munro	• • • •	"	355
Wallichiana, Sternb	"	396	sp., Str. & Wint		"	855
SAXIFBAGACEÆ	11.	388		• •••	i.	283
Saxifrages	ii.	388	crenata, Korth		"	289
Scabiosa, Linn	iii.	218	hypoglauca, Miq		"	289
Brunoniang, Wall	"	218	khasiana, Dyer		"	289
Candollians, Wall	"	219	mollis, Dyer		"	238
Candollii, DC	,,	219	Norcnhæ, Reinw		"	289
Hookeri, Clarke Olivieri, Coult	"	218	Wallichii, Chois		,,	289
Olivieri, Coult	,,	219	Wallichii, Chois.		,,	283
speciosa, Royle	,,,	29	Schismatoglottis, Zol	i. Ş		
Scabrita scabra, Linn	ħi.	603	Morita		٧i.	537
triflora, Linn	,	603	brevicuspis, Hk. f		,,	537
Somvola, Linn	iii.	421	brevipes, Hk. f		,,	538
Bela-Modagam, R. & S	,,	421	calyptrata, Zoll. & M	loritz	,,	539
chlorantha, De Vr	,,	421	elongata, Engl		,,	58 9
Koenigii, Vahl	,,	421	Kurzii, Hk. f		"	539
Lambertiana, De Vr	,,	421	longipes, Mig		,,	538
lativaga, Hance	"	421	minor, Hk. f		"	538
Leschenaultiana, DC	"	421	mutata, Scort		,,	538
Lobelia, Linn	"	421	Scortechini, Hk. f		"	537
Lobelia, Ham	"	421	Wallichii, Hk. f		"	537
Macræi, De Vr		421	Schismus, Beauv		vii.	335
macrocalyx, De Vr	"	421	calycinus. C. Koch		,,	336
montana, Lab	"	421	hiroutus, Trin		"	336
Plumieri, Bl		421	marginatus, Reauv		,,	336
Plumieri, Vahl	"	421	Schizachyrium, Benth.		vii.	165
senegalensis, Presl	"	421	brevifolium, Nees		"	165
sericea, Forst	,,	421	hirtistorum, Nees		9:	167
Sieheri, De Vr	"	421	semiberbe, Nees		"	167
	"	421	zeylanicum, Arn		"	167
Taccada, Rosb Thunbergi, Eckl. & Zey.	"	421	Schizandra, Micha		i.	44
uvifera, Stooks	"	421	axillaria Hk f. & T.		,,	45
velutina, Presi	"	421	axillaris, Hk. f. & T. elongata, Hk. f. & T. grandiflora, Hk. f. &	•••		44
	,,	-20-2	grandiflors. Hk f &	$r \cdots$	"	44
Scaligeria elata, Boiss. &	ii.	673	propinqua, Hk. f. &	r \cdots	"	45
Haussk		673	SCHIZANDRE		i.	89
meifolia, Boiss	"	692	Schizocalya coria ceus, Ho		iii.	619
Scandix, Linn	11.	692	Schizochiton, ? Wall		i.	551
Pecten Veneris, Linn	"	287	Schizolepis, Ners		vi.	694
Scapha Candolli, Chois	1.		Schizonephros glaucesce		٠.,	-
pinangiana, Chois	"	287	C 1/0		٧.	79
Scaphespermum trilobum,	::	804	Schizostachynm, Nees		٧ı .	415
Edgew	ji.	694				417
Scaphium Wallschii, Br	j.	361	aciculare, Gamble Blumei, Nees		"	416
Scaphochlamys, Baker	¥Ĵ.		chilianthum, Kurs		"	416
malaccana, Baker	"	252			"	395
Scepa Lindleyana, Wight	₹.	349	Durie, Rupr ? elegantissimum, Ku		"	416
microstachia, Tulasue	"	349			"	408
P stipulacea, Lindl	"	349	hindostanicum, Kurz		"	416
villosa, Liudl Schaueria graveolens, Hassk.	,,,	345	latifolium, Gamble		1)	417
Schaueria graveolens, Hassk.	1₹.	630	longispiculatum, Kor		"	415
Schedonorus asper, Gaud	V11.	335	tenne, Gamble		**	AID

		Val	. Page	Schoenus		Val	Page
Schizostigma, Arn.			. 100	1		vi.	
hireutum, Arn			100	niveus, Linn			620
Schleichera, Willd.	•••	. ,"	681	paniculatus, Hasak.		" "	
pentapetala, Roxb.			3, 6 81	polymorphus, Rottb			639
pubescens, Roth			681	puberulus, C. A. Me		"	649
trijuga, Willd			681		-	"	668
trijuga, Moritz		678	3, 681	1 6 77 3	•••	"	661
Schmidelia acuminat			673	surinamensis, Rottb	•••	"	670
adenophylla, Wall.			674			?"	581
Aporetica, Wall.			674	Schoopfia, Schreb.		j.	582
Allophyllus, DC.	•••	•	673	1 4 100 74		"	58 L
	•••		673	densta Well	···、···	"	
bidentata, Wall.			674			"	581
Cobbe, DC	, ··· ··		674	Schollia (Scholera) cras	syona,		20
cochinchinensis, Do			674	Jacq	•••	i₹.	62
dentata, Wall				7 75	••• •••	iii.	
distachya, DC	•••	••	674		•••	33	604
fælidissima, Wall.	•••	, ,,	674	swietenioides, Rozb.		٠,,	604
Gemella, Camb			674			1.	628
glabra, Wall		"	674			."	623
hispida, Thw	::		678		•••	iı.	697
integerrima, Wall.	1.		, 674	? Benthami, Clarke.	•••	"	697
Kobbe, Lamk		j,	674			**	701
orientalis, 3w		"	674	Schumacheria, Vahl .		j.	34
racemosa, Linn.	•••	"	674	alnifolia, Hk. f. & T.		,,	34
Rheedii, Wight	•••	"	674	angustifolia, Hk. f.	δy T.	"	34
serrata, DC		"	674	castaneæfolia, Vahl	•••	,,,	35
ternata, Camb		"	674	Sohweinfurthia, A. B.	raus	iv.	252
timorensis, DC		"	674	papilionacea, Boiss.	•••	,,	252
varians, Thw		"	673	sphærocarpa, A. Bra	un	"	252
vestita, Wall	•••	"	674	Sciadicarpus Brongnic	ırtii,		
villosa, Koxb		"	670	Hassk		ii.	114
villosa, Wight		,,	674	Sciadophyllum ellipticu	nn, Bl.	ii.	729
sp., Hk. f. & T.		"	673	Sciaphila, Bl		Ϋį.	558
sp., Wall		"	674			"	558
Schmidia bicolor, Wig		iv.	393			"	558
Schoberia corniculata,				h-h		"	559
Меу		v.	14	secundiflora, Thw	•• •••	"	558
indica, Bunge		"	13	O-211- T	•• •••	V.1.	348
maritima, C. A. Mey		"	14		•• •••		349
microsperma, D. A.		"	15	coromandeliana, Rox		"	347 .
Schænefeldia gracilis,		vii.		A		"	347
		"	289	J J _ 4 _ YT	·· ···	"	847
~ T ' 'h)		. 54,		Hohenackeri Fisch	& Men	"	349
	•••	vi.	56	indica, Baker		"	348
		vi.	672	indica, Roxb		"	347
	··· ···		671			"	348
		"	670			••	346
calostachyus, Poir.		"	678	~ · · · · ·		••	301
		"	588	0-1-1 0 1 44			
, , ,		"	660				541
	••• •••	"	649	TD 12 0 77 1		•••	511
	••• •••	99	672	anned mean March		••	542 540
		"	677	caudatus, Engl			549
	•••	"	656	caudatus, Schott		•	549 549
	··· ···	••		Crassipes? Engl			542
lithospermus, Linn.		>>	685 669	Cuscuaria, Presl			542
	•••	**		decursivus, Schott			547
Mariscus, Linn	•••	99	674	giganteus, Schott	• •••	99	541

Soindapaus		V.I	Dage	Scirpus	•	37-1	D
glaucus, Schott		Vol.∶ vi.	547	1			Page 658
hadama C.1.44			542	Cephalotes, Jacq.	•••		589
inglinatus, Schott	•••	"	542	cernuus, Vahl		• •	655
marantæfolius, Miq.	•••	"	543	chinensis, Munro		662	
medius, Zoll. & Moritz		"	540			:	666
	•••	"	540	ciliaris, Linn			650
-40 -1 - 11 O 1 1	•••	"	541	cinnamometorum, Vi comosus, Wall			664
70 7 0 1 11	•••	,,	545				616
7) 1 2711	•••	"	547		• • • • • • • • • • • • • • • • • • • •		660
7, 1, 777, 4	•••	"	542		•••		654
mandana Oak ass	•••	"	517	4 (1)	•••	•	
	•••	"	541		• • • • • • • • • • • • • • • • • • • •		630
piotus, Hassk	•••	"	549		•••		684
pinnatifidus, Schott	•••	"	549		• • • • • • • • • • • • • • • • • • • •		619
pinnatus, Schott	•••	"		corymbosus, Heyne			657
pothoides, Miq	•••	"	542	corymbosus, Forsk.	• • • • • • • • • • • • • • • • • • • •	"	659
pothoides, Schott	•••	"•	541		•••	"	670
Scorteshinii, Hk. f	•••	":	541		•••	"	665
SCIRPEÆ	•••	vi.	586		•••	,,	622
Scirpodendron, Kurz	•••	vi.	684			"	656
costatum, Kurz	•••	"	684			,,	652
sulcatum, Mig	•••	"	684		• • • • • • • • • • • • • • • • • • • •	,,	636
Scirpus, Linn	•••	vi.	353		···	,,	636
acicularis, Linn	•••	"	629	dipsaceus, Rottb.		"	635
acutangulus, Roxb	•••	,,	627			"	661
mulans, Steud	•••	"	660	, ,		"	663
æstivalis, Retz		,,	637	? dubius, Roxb.		,,	625
æstivalis, Wall		,,	635	Duvallii, Hoppe		٠,	658
affinis, Roth		11	659	echinatus, Linn.		,,	621
afflatus, Benth		,,	629	clongatus, Ham.		***	664
alpinus, Schl		,,	654	eroctus, Poir		,,	656
anceps, Willd		,,	646	Eriophorum, Mich.		,,	661
annuus, All	• • •	"	636	falcatus, Vahl		,,	617
annuus, Host	•••	,,	636	ferrugineus, Linn.	···	,,	639
anomalus, Retz		,,	678	fimbrisetus, Delile			659
antarcticus, Thunb		,,	651	fistulosus, Forsk.		"	656
argenteus, Rottb		,,	640	fistulosus, Poir		,,	627
aristatus, Willd		,,	666	fluitans, Linn		,,	653
articulatus, Linn		"	656	fuscus, Roxb		,,	639
arvensis, Retz		"	639	globulosus, Retz.		1)	645
arvensis, Roxb		"	636	globulosus, Roxb.		,,	639
atropurpureus, Retz.	•••	"	627	glomeratus, Heyne		,,	602
Beothryon, Ehrh		,,	654	1		,,	620
Balna, Ham		,,	659	7 1 13		,,	640
bangalorensis, Heyne		"	657			"	636
barbatus, Boeck	•••	"	653	gracillimus, Boeck.		,,	652
barbatus, Rottb	•••	"	651				660
benghalensis, Pers		"	644				659
bispicatus, Roxb		•••	634	hakonensis, Franch.			630
brevifolia, Done		,,	660	hemisphæricus, Rotl			667
brevifulius, Roxb	···	"	636	Holoschonus, Linn			655
carspitosus, Boeck		"	654				657
canaliculato-triqueter,	•••	"					656
			660				663
	•••	"	652	javanus, Nees			657
	•••	"	666	junciformis, Necs			656
capitatus, Burm	•••	"	628	1		• • • • • • • • • • • • • • • • • • • •	656
capitatus, Linn	•••	**	660	kyllingioides, Boech			662
Caricis, Retz	•••	11/	300	a jiiiigioucos, ineci		• "	.,02

Scirpus	Vol	Paga	Scirpus Vol. Page
Kysoor, Roxb			Salbundius (Salbundius),
lacustris, Linn		638	Ham vi. 644
lateralis, Heyne		656	Sarii. Seh. & Maur ,, 655
Lawianus, Boeck		648	scaber, Roxb ,, 631
laxiflorus, Thw	. ,,	626"	sca' errimus, Boeck , 660
lithospermus, Linn	. ,,	685	schænoides, Retz ,. 634
littoralie, Schrad	. ,,	659	schanoides, Roxb ,, 619
luzonensis. Presl	٠,,	656	setareus, Linn ,, 654
macrostachys, Boech	. ,,	659	spiralis, Rottb, 627
maritimus, Linn	• ,,	658	squarrosus, Linn ,, 663
maritimus, Maxim		659	strictus, Roxb ,, 640
maximus, Roxb	-	659	strobilinus, Roxb ,, 659
medius, Roxb melanospermus. C. A.	٠ ,,	627	enhanitarna (Thu eg)
		655	anhmanana Cassa 859
3/ " 37		658	
	. 596		0 -1.1.1.4 10
		644	11 17-11 // 010
miliaceus, Linn		644	aundanus Win GET
miliaceus, Roxb		636	supinus, Linn ,, 655
minimu Roxb		635	sylvaticus, Strach ,, 662
mollis, Wall		672	Talamamantani Carol " 659
monander, Rottb		640	tenellus, Roxb ,, 642
monander, Roxb		651	ternatanus, Reinw ,, 662
monostachyus, Kosn		634	te natus, Haro ", 656
mucronatus, Linn		657	tetragonus, Pcir " 644
mucronatus, Roxb		656	Thwaitesii, Boeck " 652
mutatus, Roxb		627	timorensis, Kunth ,, 656
muticus, D. Don	**	657	tranquebariensis, Roth, 639
mysurensis, Heyne	,,	657	trialatus, Boeck ,. 605
nutans, Retz		632	triangulatus, Roxb ,, 657
Onaei, Franch. & Sav		630	tridentatus, Roxb ,, 659
ovatus, Roth	,,	628	trifidus, Hance " 652
pallescens, Roxb	,,	636	triflorus, Poir " 670
palustris, Linn	"	628	triqueter, Linn , 658
pauciflorus, Lightf	,,	654	trigueter, Gren. & Godr. ,, 659
pectinatus, Roxb	,,	659	tristachyus, Boxb ,, 639
pentagonus, Roxb	,,	644	tumidus, Roxb ,, 626
petasatus, Maxim	"	630	umbellaris, Lam ,, 645
pilosus, Retz	•,	666	uncinatus, Willd ,, 666
plantagineus, Retz	33 ·	625	uniglumis, Link ,, 628
plantagineus, Roxb	"	626	validus, Vahl " 658
plantaginoides, Rottb	"	625	Wallichii, Nees " 656
plumosus, Br	"	659	Wichurai, Boeck ,, 661
Pollichii, Gren. & Godr	97	658	Wichurai, Franch. & Sav. ,, 630
polytrichoides, Retz	"	632	Wightianus, Boeck ,, 658
prælongatus, Poir	"	656	sp., Rottb ,, 600
puberulus, Boeck	"	651	sp., Wall vi. 6 6, 657, 660
puberulus, Poir	",	653	Scitaminea Finlayso iana,
pubescens, Lam	"	665	Wall vi. 203
pumilus, Vahl	,,	654	SCITAMINEE vi. 198
quadrangulus, D. Don	"	663 -	Sclerachne punctata, Br vii, 102
quinquangularis, Boeck	"	615 644	Scieria, Berg vi. 685
quinquangularis, Vahl	٠,		alata, Moon ,, 689
quinquefarius, Ham	"	657 658	alta, Boeck ,, 690
riparius, Presl	19	661	androgyna, Nees ,, 686 annularis, Kunth 667
rufus, Schrad	"	OOT (annularis, Kunth ,, 667

Scleria	V ol	Page	Soleria
mana Danah		691	C4 3 .1/ 35°
		689	otional and a Mb-
L L	٠,	693	Garabatana Danit
h:4 D1	-	637	4
branconto Class		694	a maturate D.I.
! -! D11		688	T . A . A
and and a Value	"	638	
ahinamaia Vanth		690	l 'm
ailiania Maan	"	690	1 11 -4 - TTL & 6 - TT - 207
annountiform Danala	,,	686	
		686	
-1-A- 070		690	william and Danala COM
	"	690	mantite Doorle 190
	,,	690	" 100
eraltata, Boeck fl.coids, Clarke	"	688	
	. 690,		nominance Dain 697
	••		1 3
hebecarpa, Nees		689 688	
hebecarpa, Thw	"	692	sp., Hk. f. & T. vi. 639, 691, 692, 694
hirsuta, Moon	"		sp., Wall vi 685, 686, 697,
Hookeriana, Boeck		691 600	639, 690, 693, 694
junciformis, Thw	"	692	SCLERIEE vi. 587
khasiana, Clarke	200	692	Sclerocarpus, Jacq iii. 305
	. 689	692	1
lævis, Willd	vi.	694	Sclerochloa, Beauv vii. 335
lateriflora, Boeck	**	688	dura, Beauv , 335
latisolia, Moon	"	691	Scleromitrion, W. & A iii. 60
laza, R. Br	"	688	1
levis, Re/z	**	694	hispidum, Korth ,, 61
lithosperma, Sw	"	685	rigidum, Kurz ,, 60
lithosperma, Roxb	"	690	tenellistorum, Korth ,, 60
macrocarpa, Wall	"	681	tetrandum, Kurz ,, 54
macrophylla, Presl	"	693	tetraquetrum, Miq ,, 60
majus, Moon	"	686	Sclerophyllum coarctatum,
malaccensis, Boeck	27	693	Griff vii. 98
melanosperma, Nees & Aru.	"	692	Soleropyrum, Arn v. 234 Maingavi, Hk. f 235
melanostoma, Boeck	"	693] =====================================
multifoliata, Boeck	"	693	Wallichanum, Arn ,, 234
Neesii, Kunth	"	688	Sclerostylis Arnottiana Wight i. 513
orizoides, Boeck	,,	691	atalantioides, W. & A, 508 atalantioides, Wight, 512
oryzoides, Presl	,,	691	
pandanophylla, Kure	"	714	ovalifolia, Wight ,, 512
parvula, Steud	"	687	parrifolia, Wight , 512
pergracilis, Kunth	"	685	, moonande, pp ,,
pilosa, Boeck	"	692	
Plamii, Boeck	"	692	Rozburghiana, Hk. f. & T. ,, 513
propinqua, Stead	,,	F86	
psilorrhiza, Clarke	,,	691	zeylanica, Wight ,, 513
pubescens, Steud	"	689	Scolochloa arundinaccu, Mert.
pubescens, Zoll	"	693	
purpurascens, Stoud	"	693	Scolopia, Schreb i. 190
Radula, Hance	"	691	acuminata, Clos ,, 191
Ridleyi, Clarke	"	686	chinensis, Clos ,, 191
Rinkiana, Boeck	"	694	crassipes, Clos ,, 191
rugosa, Br	**	688	crenata, Clos ,, 191
scrobiculata, Moritz	"	690	dasyanthera, Benn ,, 191
scrobiculata, Zoll	"	689	Gertneri, Thw ,, 191
setigera, Boxb	"	693	lanceolata, Clos ,, 191
· ·			

Scolopia		. Page	Scutellaria		Vol. P	
	. i.	191		•• •••		569
	,,	191		•• •••	17.	370
	,,	190		•• •••	,,,	369
	,,	190	celtidifolia, A. Ham.	1	"	369
	۰۰ .,,	1910	Colebrookiana, Bentl	n	"	368
Scoparia, Linn	iv		discolor, Coleb.	•• •••	"	367
	۰۰ ۰۰					368
	., iv		galericulata, Linn		•••	370 200
	,,	245		•• •••		369
Datora, Dunal	,,	245			" 4	67
	,,			•••••	••	369
	,,			•••	"	568
	,,		Heydei, Hk. f		" 4	567 568
• • • • • • • • • • • • • • • • • • • •	v		1			668
•0 1 0	;	193		•••	"	368
	1.		I Down	4.	"	520
			I be a single of the last		"	369
Scorodosma fætidum, Bung			12		" "	569
77 !!: YII A	V		l committee and	•••	"	670
	·· "		minor, Huds mussooriensis, Wawr		"	669
	;;		1 1 1 1 1			368
Scorzonera, Linn	iii	410		•••	" - 2	568
	,,	419 418		•••		570
divaricata, Turcz	,,	419	prostrata, Jacquem.		<i>"</i> 4	367
	,,	418	1 . 1 . 11 . D	•••	" '	567
	•• "	410	1 17	•••	"	369
C	,,	410	1 1 1 777 77	•••	"	670
Stewartii, Ilk. f	,,	419			•••	668
	,,	418	7 0 0		"	669
		~	squamulosa, A. Ham		-" 2	670
Scotanthus Porteanus, Nauctubistorus, Nauctubistorus, Nauctubistorus		611	1 7		"	668
			Wallichiana, A. Hai		"	669
	iv	024	Wightiana, Benth.	10		668
1.1. I. Och I. B. O.	••• ••	957	Scutia, Comm	··· ···	,,	640
1 D Al	,	959	Commersoni, Brongn			8±0
and the second	•• ••	956		·· ···	" '	640
	, ,	958	1 1 11 '0 n'		•	640
decumbens, Fisch. & Me	··· ,	954	paniculata, G. Don		"	617
3		956	Rheediana, Wight		" "	640
1	··· ,	956	Scutinanthe brunnea,		"	531
77 1	•	955	Scyphellandra, Thw.			189
1 Mars 70	··· ,	OFF				189
glandulosa, Waldst. & Ki		, o- (Scyphiphora, Gartn.		iii.	125
CV 100 12 12 10 43.	• *	956		Gærin.		125
himalanda Daula	-	955	Scyphopetalum, Hiern		i.	675
17 . 4 3 111	··· ,	956	ramiflorum, Hiern			676
123- Finn	,	956	Scyphostachys, Thu.		iii.	122
- N. A	,	954	coffeoider, Thw.		,,	122
D12		, 253	pedunculatus, Thw.			122
market Day	,	. 955	Scytalia bengalensis, R			689
		, 256	1 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		"	688
O 122 TT	,	954	70 70 1			684
	,	054	1		565,	
731 1	,	956	7 /4 - 1 / D 1.			688
~ · · · · · · · · · · · · · · · · · · ·	i		T D L	•••		689
O 4 33 4 F1	iv		1	•••		687
			•		••	·

a					
Scytalia		Page	Sedum	₹ol	. Page
rimosa, Roxb	i.	690	himalayanum, Wall	ii.	
rubra, Roxb	***	684		,,	418
trijuga, Roxb	"	681		,,	419
verticillata, Rozb		684		. ,,	418
Beaforthia costata, Mart	₹i.	409		. ,,	417
Dicksonii, Mart	,,	409		. ,,	421
disticha, Mart	"	408	japonicum, Sieb	. ,,	422
gracilis, Mart	"	407	linearifolium, Royle		420
Kuhlii, Mart	"	409	Moorcroftianum, Wall	. ,,	422
malaiana, Mart	,,	410	mucronatum, Edgew	. ,,	420
oryzæformis, Mart	,,	409	multicaule, Wall	. ,.	422
patula Mart	,,,	411	pallidum, Bieb		421
Sebra, R. Br	iv.	99	paniculatum, Wall	. ,,	413
aurea, R. Br	,,	99	pauciflorum, Edgew		420
carinata, Spreng	,,	98	perpusillum, Hk. f. & T	. ,,	422
khasiana, Clarke	27	99	pyriforme, koyle		420
Sebastiana, Spreng	₹.	475	quadrifidum, Pall		418
Chamæles, Muell	, 11	475	Rhodiola, DC	. ,,	417
Sebestena ficinalis, Gwrin.	iv.	136	rosulatum, Edgew	. ,,	420
Sebifera glutinosa, Lour	₹.	158	rubrum, Royle	. ,,	421
Secamone, Br	iv.		serratum, Jacquem		417
canescens, Sm	"	63	sinuatum, Roylo		420
emetica, Br	"	13	spinosum, Thunb	٠,,	416
Finlaysoni, Wight	,,	13	Stracheyi, Hk. f. & T		418
villosa, Bl	,,	13	tibeticum, Hk. f. & T		418
SECAMONEÆ	iv.	2, 12	trifidum, Wall		420
Securidaca, Linn	i.	207	trullipetalum, Hk.f. & T	. ,,	421
bracteata, A. W. Benn	,,	208	Urvillei, DC	٠,,	422
in ippendiculata, Hassk	"	208	Wallichianum, Hk.f. & T.	. ,,	419
paniculata, Wall	,,	203	Seetzenia, Br	i.	424
scandens, Ham	,,	208	orientalie, Dene	,,	124
tavoyana, Wall	,,	208	Sehima, Forsk	vii.	136
Securinega hysterantha, Boj.	v.	305	ischæmoides, Forsk	"	136
Leucopyrus, Brand	,,	328	Kotschyi, Hochet		136
Leucopyrus, Muell	,,	329	macrostachyum, Hochst		136
obovata, Muell	,,	328	Seidlia, Opiz Seidlia, Kortel		661
ramiflora, Muell	٠,	329	Seidlia, Kortel	i.	302
virosa. Baill	,,	329	lanceæfolia, Kostel	**	302
Seddera evolvuloides, Wight	iv.	224	SELAGINER	iv.	558
latifolia, Hochst	,,	224	Selago pusilla, Thunb	i٧.	281
Sedgwickia cerasifolia, Griff.	ii.	429	Silan lanceolatum, Spreng.	i.	498
Sedum, Linn	ii.	417	Selenipedium Parishii, Joli-		
adenotrichum, Wall	,,	420	bois	٧i.	174
asiaticum, $DC \dots \dots \dots$	"	419	Sclinum, Linn	ii.	699
atropurpureum, Ture	"	.418	Candollii, DC	,,	70)
azureum, Royle	,,	421	Candollii, Edgew	,,	700
bupleuroides, Wall	,,	418	? dissectum, Wall	"	701
coccineum, Royle	13	418	glaucum, Wall	,,	710
coriaceum, Wall	,,	419	papyraceum, Clarke	"	701
crassipes, Wall	,,	419	stellatum, D. Don	"	705
orenulatum, Hk. f. & T	"	417	striatum, Benth	,,	699
elongatum, Wall	,,	419	tenuifolium, Wall	"	700
Kweraji, Ledeb	,,	421	vaginatum, Clarke	"	700
fastigiatum, Hk. f. & T	,,	419	Sellowia uliginosa, Roth	ii.	569
Gerurdianum, Wall	,,	421	Semecarpus, Linn.f	ii.	80
Griffithii, Clarke	"	421	aouminata, Thw	,,,	83
heterodontum, Hk. f. & T.	"	417	? acuminata, Kurz	,,	85

9		_	l 0			_
Semecarpus		Page	Senecio Wall			Page
albescens, Kurz		85	aureus, Wall	. •••		355
Anacardium, Linn. f		. 80	Bhot, Clarke	•••	",	355
auriculata, Bedd		32	belgaumensis, Clarke	•••	"	818
coriacea, Thw	"	32	bracteolatus, Hk. f	•••	"	839
cuneifolia, Roxb	"	.31	Buimalia, Ham	•••	"	352
Gardneri, Thw	* **	33	oalthæfolius, Hk. f	•••	"	350
Grahamii, Wight	"	37	campylodes, DC	•••	"	352
grandifolia, Wall	,,,	41	Carda Carde, DQ	•••	"	352
heterophylla, Bl	,,,	35	Candolleanus, Wall.	•••	"	353
lævigata, Thw	,,	35	chenopodifolius, DC.	•••	,,	354
latifolia, Pers	,,	31	chinensis, DC	• • •	"	352
? lurids, <i>Hk. f.</i>	,,,	34	chrysanthemifolius, DC	• • • • •	,,	342
marginata, Thw	,,,	32	chrysanthemoides, DC	l	,,	339
microcarpa, Wall	,,	31	chrysanthemoides, DC.		"	339
Moonii, Thw	. ,,	32	cordatus, Wall	•••	32	352
nigro-viridis, Thw	, ,,	34	coronopifolina. Desf.	•••	. ,,	341
oblongifolia, Thw	ii. 3	3, 34	corymbosus, Wall		· "	351
obovata, Moon	ii.	32	corymbosus, Clarke		"	3 49
obscura, Thw		33	Dalzellii, Clarke	•••	"	349
obscura, Thw	••	33	densiflorus, Wall		"	355
parvifolia, Thw	•	34	densiflorus, DC			355
pubescens, Thw	• • •	31	dentatus, Wall		"	353
subpanduriformis, Wall		35	denudatus, D. Don			340
subpeltata, Thw		33	diversifolius, Wall.		"	340
	"	35	\ ,,, <i>r,,</i>	•••	"	342
Mile and the att The C		31	dubius, Hk. f. & T	•••	"	342
		31		•••	"	316
travancorica, Bedd		38	Edgeworthii, Hk. f.	•••	"	352
Walkeri, Hk. f	,,		flexicaulis, Edgew	•••	"	352
? zeylanica, Bl		33	flevuosus, Wall Gardneri, Thw	•••	"	348
Se neiocardium glaucescens,	•	901		•••	"	347
Hassk		201	Gibsoni, Hk. f	•••	"	
Hamiltonii, Hasek		201	graciliflorus, DC	•••	"	338
hyalinum, Hasek		201	gracilis, Arn	•••	"	341
Sempervivum, Linn	ii.	422	Grahami, Hk. f.	•••	"	347
acuminatum, Done	"	422	Griffithii, Hk.f. & T.	•••	"	341
album, Edgew	"	423	hastatus, Linn	•••	"	358
fimbriatum, Klotz	"	423	hewrensis, Hk. f	•••	"	346
himalayense, Klotz	,,	422	Hindsii, Benth	•••	"	352
mucronatum, Edgew	"	42 3	Hohenackeri, Hk . f .	•••	"	345
sedoides, Done	"	423	intermedius, Wight	•••	"	852
Senacia nepalensis, DC	i.	199	Jacobæa, D. Don		"	339
Senecillis Jacquemontiana,			Jacquemontianus, Bent	h	*	350
Dcne	iii.	350	Kunthianus, Wall	•••	,,	354
Seneoio, Linn	iii.	338	Kurzii, Clarke ·	•••	"	34 l
acuminatus, Wall	,,	35 t	laciniosus, Arn	•••	,,	346
alatus, Wall	"	358	laciniatus, Wall	•••	"	339
alpinus, Clarke	,,	339	lætus, Edgew	•••	,,	339
amplexicaulis, Wall	11	848	lavandulæfolius, DC.	•••	,	343
analogus, DC	".	339	Lawii, Clarke	•••	"	847
Andersoni, Clarke	"	356	Lessingianus, Clarke		"	344
angulosus, DC	"	355	Levingii, Clarke		"	853
angulosus, Wall	"	355	Ligularia, Hk. f	•••	"	349
arachnoideus, Wall		351	linifolius, Clarks	•••	"	343
araneosus, DC	"	851	ludens, Clarke		"	345
arnicoides, Wall	"	351	macranthus, Clarke	•••	"	349
Arnottianus, DO	"	341	Mishmi, Clarke		"	844
4.01	"	350	Mortoni, Clarke	•••	"	349
Atkinsoni, Clarke	"	300	actions, Course	•••	"	

Senecio	V ol	Page	I Senna	•	val	Page
multifidus, Willd	iii.	346	arborescens, Roxb.		• •	265
nilaycrensis, Schultz	,,	337	'auriculata, Roxb.		-	263
nilghervanus, DC	"	341	bicapsularis, Roxb.			263
niveus, Wall	"	390	dimidiata, Buch.			266
nudioaulie, Ham	"	340	esculenta, Roxb.			262
obtusatus, Wall	"	340	erigua, Koxb			265
pachycarpus, Clarke	"	349	obtusa, Roxb.	•••		264
pallens, Wall	"	340	occidentalis, Roxb.			262
pallens, Wall pedunoulatus, Edgew	"	342	officinalis, Roxb.	•••		264
pedunculatus, lik. f. & T.	"	342	prostrata, Roxb.	•••		266,
P peguanus, QC		856	purpurea, Roxb.			263
pilosiusculus, Clarke		344	sensitiva, Roxb.			266
pinnutifidus, Clarke		345	Sophora, Roxb			262
polycephalus, Clarke	"	344	speciosa, Roxb.			265
quinquelobus, Hk. f. & T.		353	sumatrana, Roxb.			261
Rabani, Clarke		344	tenella. Roxb			266
racemosus, Wall	"•	350	Tora, Roxb		• • •	263
	"	342	toroides, Roxb		-	263
and how if alice . Wall	"	340	Senra, Cav		- :-	333
man deanned a Mente	"	331	incana, Cav			334
reticulatus, Clarke	"	347	Sephalica, Jones		ιίi.	603
	"	850	Septas hypericifolia,			•••
D. J D.A	"	338	vide Daphne			196
- A	"	355	repens, Lour		iv.	
A!!! - TET 12	"	344	Serapias Epidendraa,			198
ת תינו	"	352	epidendrea, Retz.			ĩ
7 777 11	"	352	Serianthes, Benth.			301
	"	350	grandiflora, Benth.			301
o		356				175
	"	339	panciflorum, Stock			175
* 1 *1* NY 11		339	Sericura japonica, S. e		vii	304
	"	352	Serissa ceylanica, Th			193
stipulatus, DC	"	339	corymbosa, Bedd.			194
stipulatus, Wall subdentatus, Ledeb	"	342	fragrans, Bedd.			1.3
tanacetoides, Kth. & Bouch	٠,,	338	Gardneri, Thw.			192
A R. 12 D		345	scabrida, Thw			193
	"	342	ternata. Kurz			193
· ·	"	352	Wightii, Bedd		"	193
tetranthus, DC	"	348	Serpicula, Linn		• •	43l
Thomsoni, Clarke	"	340	brevipes, W. & A.		431	
tibeticus, Hk. f	"	346	hirsuta, W. & A.			431
tomentosus, Clarke	"	356	himuta Wight			431
triligulatue, Ham		340	hirsuta, Wight indica, Thw			431
truncatus, Wall	"	355	indica, Thw			431
uncinellus, DC	"	35 5	veronicafolia, Bory			432
vagans, Wall	"	340	verticillata, Roxb.			432
violaceus, Wall		342	zeylanica, Arn.			431
rulgaris, Linn	"	851	sp., Wall	•••		431
Walkeri, Arn	"	337	Serpicula, Linn. f.			659
Walkeri, Thw	"	353	verticillata, Linn. f.			659
Wallichii, DC	"	852	Serræa incana, Done.		- 77	334
Wightianus, DC	"	344				334
Wightii, Benth	"	348	l			
Yakla, Clarke	"	34 0	Cavanillesii, Willk.			360
seylanicus, DC	2,,7	830	mollis, Parl			360
SENECIONIDEM iii.	ii.	26 5	patulus, Parl	•••		861
Senna Absus, Roxb		264	scoparius, Parl.			360
alata, Roxb	"	∠ ∪7	. ovopurske, z oz i.		. ,,	

Serrafalcus	v	ol.	Page	Setaria		Vok	Page
Thomini, Hard			860	compressa, Kunth	•••	vii.	85
~			379	dasyura, Hort		, 13	79
m71	•••	,,	374	decipiens, C. Schimp.		٠,٠	80
anthelmintica, Roxb.		,,	236	erythrosperma. Horuen	a.	"	78
carthamoides, Roxb,	•••	,,	379	Fieldingii, C. Muell.		,,	81
cinerea, Roxb	•••	"	234	flava, Kunth		,,	79
divaricata, Fisch & Mey.	•••	,,	3 83	flarida, Hornem		,,	78
indica, Wall		,,	377	floribunda, Spreng		,,	80
Pindica, Willd	•••	,,	381	Forbesiana, $Hk. f.$	•••	,,	81
macrocephala, Wall.	•••	,,	378	germanica, Beauv		"	78
multicaulis, Wall	•••	,,	373	glauca, Beauv	•••	"	78
pallida, DC		,,	379	glauca, Hochst	• • • •	",	80
	•••	,,	271	globularis, Presi	•••	,,	78
Sesamum, Linn	•••	i⊽.	386	gracillima, Hk. f	•••	,,	81
indicum, DC		,,	887	helvola, R. & S	••	"	79
	••	"	387	? hirsuta, Kunth	•:•	,,	35
		,,	387	hirta, Kunth	•••	. 33	81
occidentale, Heer & Reg	el	,,	287	hirtella; Schult	•••	11	66
orientale, Linn	• • •	,,	387	humifusa, Dum	•••	. ".	79
	•••	"	387	? imberbis, R. & S	Vi	ii. 79	9, 80
	:	ii.	114	intermedia, $R. S S$.	•••	v.i.	
	•••	19	114	italica, Beauv	•••	"	78
	•••	,,	114	longiflora, Desv	•••	,,	62
	•••	"	115	luzurians, Willd	•••	**	82
	•••	,,	115	macrochæta, Schult.	•••	"	78
	•••	,,	115	macrostachya, Duthie	•••	"	81
	•••	,,	114	macrostachya, H. B. K.	•••	"	81
procumbens, W. & A.	•••	,,	115	maritima, R. & S	•••	,,	78
	•••	,,	115	mauritiana, Spreng.	•••	"	56
	•••	11.	693	melinis, Link	•••	**	78
ammoides, Jacq benyhalensis, Roxb	•••	,,	682	nana, Dum	•••	••	80
benyhalensis, Roxb	•••	"	696	nubica, Link	••	"	80
	•••	,,	693	panis, Jessen	•••	,,	78
	•••	,, ·.	693	penicillata, Nees	•••	,,	79
	• • •	,,,	693	penicillata, Wall	•••	"	80
	• • •	:9	694	persica, Hornem	•••	"	78
	••	. 9	684	pilifera, Spreng	•••	**	35
	• • •	١.	666	pumila, Schult	•••	,	79
	٠. ١	<i>/</i>).	335	respiciens, Hochst	•••	"	80
	•••	"	334	Rottleri, Spreng	•••	37	80
		"	306	rubicunda, Dum	•••	,,	79 79
Bestochilos uniflorum, Beec		٧.	755	? sciuroidea, C. Muell.	•••	"	79 59
	• • •	ìı.	659	P stricta, Kunth	•••	"	79
		"	659	tejucensis, Kunth	•••	**	80
		"	659	? tomentosa, Kunth	•••	"	79
41 (0.1.1)		11.	77	Ventenatii, Kunth	•••	"	
ambiana Ossa		"	80 80	verticillata, Beauv	•••	"	80 70
a lakton III. oa		,.	78	verticillata, Wall verticilliformis, Dum.	•••	,,	79 80
		"	82	villosa, Beauv	•••	"	80
aspera, Miq		"	79	violacea, Hornem	•••	"	78
		"	79	viridis, Beauv	•••	,,	80
TP 1		17	81	Weinmanni, R. & S.	•••	**	80
		"	87	sp., Wall	•••	**	78
		"	80	Sethia acuminata, Arn.	•••	i.	415
3	•••	"	79	erythroxyloides, Wight	•••		415
. A (d - 1	•••	"	78			"	414
compacta, Sohur	•••	"	. • •	indica, DU	•••	* 99	41.2

Sethia .		Vol	Page	Sida	•	Vol. Pag	-
Kunthiana, Wall.		i.	414	alba, Linn		i. 32	
7 2 4 Mb		,,	415	a/nifolia, Linn		99	
		"	415	althæifolia, 8w		" 00	_
Shorea, Rozb		ï.	303	? amæna, Wall		" 22	-
acuminata, Dyer		"	305	•asiatica, Linn		" oo	-
		"	307	asiatica, Wall	•••	″ 99	
1		"	305	aurita, Wall		" 。	
A! L J - 17		"	304	Beloere, L'Her.	•••	" 9.3	-
		٠,,	307	Boriara, Wall		" 99	
7 10 . 77		"	305	canariensis, Willi		90	
		"	305	carpirifolia, Linn		, 32 , 32	
2 20		,,	306	chinensis, Rotz		,, 32	-
12		"	307	compressa, DC	•••	, 32	
		"	308	compressa, Wall		,, 82	
		"	308	cordifolia, Linn	•••	,, 32	
1 1 1 1 11 1111		"	307	corylifolia, Wall		,, 32	
		"	306	corynocarpa, Wall	•••	" 32	4
		,,	305	crispa, Linn	•••	32	8
		,,	306	cuneifolia, Roxb		322, 37	
		"	307	diversifolia, Spreng.		i. 33	
		,,	306	Eteromischos, Cav		,, 32	_
1 4 A TO (1		"	304	glandulosa, Roxb		,, 32	
		,,	304	glauca, Cav		,, 32	
Rowburghii, G. Don.		"	205	glutinosa, Roxb	•••	,, 32	
		"	306	graveolens, Roxh		,, 82	
			804	grewinides, Guill. 5		,, 32	
		"	304	herbacea, Cav		,, 32	
		"	307	heterophylla, Spreng.		33	
			304	hirta, Wull		322, 32	_
m 1		"	394	hirta, Lamk		i. 32	
Tumbuggaia, Roxb			306	humilis, Willd		,, 32	
and a Table of a		", 11.	181	indica, Linn		,, 32	
		"	182	indica, Cav	•••	,, 32	8
? ferrugines, Baker		"	182	lanceolata, Roxb		,, 32	3
		"	182	Lesch naultiana, DC.	•••	,, 32	5
hiranta Raker			182	macre phylla, Wall		,, 32	6
hirsuta, Baker involucrata, W. & A.	•• •••	"	182	micans, Cav	•••	,, 32	4
		"	182	microphylla, Cav		,, 32	4
		"	181	montana, Rozb		,, 82	8
		.:,	181	morifolia, Cav	•••	,, 32	3
		iv	217	multicaulis, Cav		,, 32	2
		,,	217	mutica, Delile		,, 32	7
Sibbaldia cuneata, Edg		ii.	346	mysorensis, Il'. & A.		,, 32	2
		,,	316	nervosa, Wall		,, 32	2
·// TEZ:11.4		"	346	obovata, Wall		,, 32	4
potentilloides, Camb.		"	347	olens, Ham		,, 34	2
procumbens, Hk. f. &		"	346	orientalis, Cav		,, 32	ŧ
procumbens, Linn		"	346	oxyphylla, Wall		,, 32	6
		"	347	pentacarpos, Roxb		,, 32	
		"	346	periplocifolia, Linn		" 32	5
		17.	000	persica, Burm	•••	,, 82	_
		,,	288	philippica, DC		,, 32	4
Sicyos oxyanthus, Wall		ıi.	000	pilosa, Retz	•••	,, 32	2
	• • • • • • • • • • • • • • • • • • • •	i.	f.95	pilosa, L'Her	•••	,, 82	
	•• ···	i.	322	polyandra, Roxb	•••	" 82	_
	·· ···	,,	827	populifolia, Lamk		,, 82	-
	· · · · · · · · · · · · · · · · · · ·	"	323	Pradicans, Car			2
	••••	,,		•			

Sida '		Vol.	Page	Silene	v	701.	Page
71 197.11		•	322	Griffithii, Boiss	`	j.	220
		•	328	O. 1 177-13 171-1-	•••	,,	219
	•••		324	1	•••	"	225
			323	1 2-0-4- C	•••	"	218
		•••	323 •	2t	•••	"	218
			324	bhasiana Dabuk		"	221
			3:4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	•		220
1 . 717 21 . (1			324	1 /	•••	"	219
1 11 111 111 6 4			324	1 34 4	•••		219
Schimperians, Hoch			322	74.26.7 - 17.3		"	220
			323	T	•••		218
	•• •••		323	D-!		"	219
O			323			"	219
		• • • • • • • • • • • • • • • • • • • •	323	1 004 1 77 2		,,	221
, 17	•• •••		322	1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		"	220
	••		327			"	219
unilocularis, L'Her	•• •••	• • • • • • • • • • • • • • • • • • • •	322	1		"	221
urticæfolia, W. & A.		••	322			"	220
veronicæfolia, Lamk.	•••	"	322	' n		"	220
	•••	"	327			",	218
	•• •••	.??	535	187 . 1. 1. 1		"	220
Sideroxylon, Linn		111.		Webbiana, Wall		,,	220
4 50 41	•• •••	"	536	0		"	
armatum, Roth		"	538	SILKNER	••	i.	212
assamicum, Clarke		"	537	Silvæa (lapsu Sylvæa)			00=
attenuatum, A. DC		"	537			V.	397
ferrugineum, Hk. &		"	537	semperflorens, Hk. & Arn.		."	397
P Gamblei, Clarke	• • • • • • • • • • • • • • • • • • • •	"	538		1	ij.	86
grandifolium, Wall.	•••	,,	536			,,	86
Hookeri, Clarke		"	537		. 1	jı.	364
Maingayi, Clarke		,,	536			"	364
malaccense, Clarke		_ ;;_	537	Simaba quassioides, Ham	. 1	i.	520
regium, Wall	. iii.	536,	542	SIMARUBEÆ	. i	i.	517
? rugosum, Wall		ν.	180	Sinapis alba, Linn	. i	i.	157
spinosum, Willd		i.	194		••	,,	156
tomentosum, Rovb		iii.	538	cuneifolia, Roxb		,,	157
tomentosum, Wall	iii.	537,	539	dichotoma, Roxb	. ,	,,	156
Wallichianum, G. Do	n	▼.	180	divaricata, Roxb		٠,	134
Wightianum, Wall.	•••	iii.	539	erysimoides, Roxb			156
sp., Hk. f. & T		,,	536	glauca, Roxb			156
Siegesbeckia, Linn			-303	integrifolia, Willd			157
brachiata, Roxb		,,	304	juncea, Linn			157
glutinosa, Wall		,,	304	nigra, Linn			156
orientalis, Linn		"	304	patens, Roxb			157
Porientalis, Roxb		"	304	pusilla, Roxb	-		134
Sieversia elata, Royle		ii.	343	ramosa, Roxb			157
Silene, Linn		i.	217	rugosa, Roxb			157
amæna, Linn		,.	219	trilocularis, Roxb	•		156
apetala, Willd		,,	218	Sindora, Miquel	• •		268
arenosa, C. Koch		"	219	siamensis, Teysm			268
Armeria, Linn		•	218	velutina, Baker			269
colorata, Poir	. ï.	218,		Wallichii, Benth			268
conoidea, Linn.		j.	218	Siphisia saccata, Klotz		ř	77
Cucubalus, Wib			218	Siphonanthus angustifulia		•	• •
dasyphylla, Turcz		"	219		', . iv	r. I	595
Falconeriana, Benth.		"	220	7 4 4 10 1		- 1	596
	•••	33	218				595
		"	219				6 29
graminijoua, Otta	• •••	"	-TO '	Siphonodon, Griff	• •		

Siphonodon	Vol.	Page	Smelov skia			vól.	Page
celastrineur, Griff	i.	629	integrifolia, C. A.	Mey.	•••	i.	152
Sirium myrtifolium, Rozb	٧.	231	SMILACE	•••	•••	vi.	300
Sison Ammi, Jacq	ii.	682	Smilaoina, Desf	•••	•••	٧i.	323
P coniifolium, Wall	"	671	albijlora, Wall	•••	•••	"	323
diversifolium, Wall	"	681	alpina, Royle	•••	•••	"	361
P tener, Wall	,,	686	bootanensis, Griff.	•••	•••	,,	323
trinerve, Hum	,,	720	divaricata, Wall.	•••	• • •	"	823
SISYMBRIEZ	j.	129	fusca, Wall	<i></i>	•••	"	323
Sisymbrium, Linn	i.	147	oleracen, Hk. f. &		•••	"	323
Alliaria, Scop	"	151	oligophylla, Hk. f.		•••	,,	323
axillare, $Hk_{\bullet}f. & T$.,	149	pallids, Royle	•••	•••	"	323
Columna, Jacq	"	150	purpurea, Wall.	•••	•••	,.	323
contortuplicatum, DC	,,	143	Smilax, Linn	•••	•••	٠.,	302
deltoideum, Hk. f. & T	"	151	aspera, Linn	,	• • •	,,	306 306
foliosum, Hk. f. & T	,,	148	aspericaulis. Wal		•••	"	3(6
himalaicum, Hk . f . & T	"	147	barbata, Wall	•••	•••	"	3 13
humile, C. A. Mey	,,*	148	Blumei, A. DC	•••	•••	"	803
Irio, Linn	. ,,	150	calophylla, Wall.	•••	•••	"	318
rrioides, Boiss	"	150	calophylla, Wall.	•••	•••	,,	307
lasiocarpum, Hk. f. & T	"	148	China, Maxim	•••	•••	"	813
Loeselii, Lunn	79	151	collina, Kunth	•••	•••	"	313
minutiflorum, Hk. f. & T	"	149	dec piens, Spreng.	•••	•••	"	305
mollissimum, C. A. Mey	"	147	elegans, Wall	•••	•••	"	304
nudum, Boiss	,,	137	elegans, A. DC	•••	•••	"	809
pannonicum, Jacq	"	150	extensa, Wall	•••	•••	"	308
planisiliquum, Hk. f. & T.	"	152		•••	•••	"	307
primulæfolium, Thom	"	152	ferox, Wall	•••	•••	**	806
rupestre, Edgew	"	148	fulgens, Wall	•••	•••	**	802
septulatum, DC	"	1:0	glaura, Rozb glaucophylla, Klot	• • • • • • • • • • • • • • • • • • • •	•••	"	804
Sophia, Linn	"	150	grandifolia, Voigt	•• •••	•••	"	810
strictum, Hk. f. & T	"	149	grandis, Wall		•••	"	810
Thalianum, Gay & Monn.	"	148	Griffithii, A. DC.		•••	**	313
torulosum, Desf	,,	146	Helferi, A. DC		•••	"	309
Wallichii, Hk. f. & T	",	149	Hohenackeri, Kun			"	810
SISYBINCHIEE	VI.		Hookeri, Kunth			"	302
Sitodium cauliflorum, Gaertn		683	indica, Vitro			"	310
Sium, Linn		683	Kingii, Hk. f	•••			807
latijugum, Clarke	"		lævis, Wall		•••	"	808
nipponicum, Maxim	"	684	lancemfolia, Roxl		•••		809
triternatum, Moon	"	684 499	laurifolia, Hoben	• •••		"	310
Skimmia, Thunb		499	laurifolia, Roxb.		٧i	3Í1.	312
japonica, Thunb		499	laurina, Kunth			vi.	812
Laureola, Hk. f		~~=	lencophylla, Bl.	•••	•••	,,	312
Skinneria cæspilosa, Ch is	. 1V. Vi.		longebracteo ats,	Hk. f		,,	805
Slackia geonomæformis, Griff.	i.	107	? luzonensis, Pres	ı		,,	309
insignis, Griff		281	macrophylla, Roz	b.		,,	310
Sladenia, Kurz		281	P macrophylla, Da	lz. & (ibs	. ,,	312
celastrifolia, Kurz			maculata, Roxb.		••••	,,	306
Slevogtia maritima, Dair		101	megacarpa. A. Do)		٠,	811
occidentalis, Griseb		101	menispermoidea,			,,	303
orientalis, Griseb		101	micropoda, A. DC			,,	808
verticillata, D. Don		400	minutiflora, A.D			,,	803
Sloetia, Teysm. & Binn		493	myosotiflora, A.		vi.	303	, 309
penangiana, Oliv	, ,,	493	Myrtillus, A. DC.			vi.	804
Sideroxylon. Teysm. & Bin	,,	493	? narcotica, Ham.			,,	289
Wallichii, King	i.	100	nilagarensis, 8:eu			"	806
Smelouskia, C. A. Mey		_00					

				•	•	
Smilar	•	Val	Dama	Smithia	Val	Рама
obliqua, Spreng		vi.	Page 313	pumila, Royle	. ii.	Page 150
			311	1 7 77		149
0		"	306	1		150
		"	811	1 TT. TT.	., "	151
orthoptera, A. DC		"			,,	148
ovalifolia, A. DC.	•••	"	312 (,,	
ovalifolia, Hk. f. & T:	•••	97	810	sensitiva, Wall	,,	149
ovalifolia, Roxb	•••	"	810	setulosa, Dals		149
oxyphylla, Wall	• • • • •	,,	808		. i.	682
owyphylla, Kunth	• • • •	"	308	calpicarpa, Kurz		632
pallescens, A. DC		"	307	Sodada decidua, Forsk	. j.	175
parvifolia, Wall.	• • •	,,	304	Soja angustifolia, Miq	ii.	184
peguana, A. DC		,,	303	hispida, Moench	. ,,	184
perfoliata, Bl		,,	313	javanica, Grah		183
polyacantha, Wall		"	311	Wightii, Grah		183
prolifera, Rosb		"	312	SOLANACEÆ	•	228
prolifera, Hk. f. & T.			310	Solandra, Murray	. i.	336
prolifera, Wall. vi.	310,	311	318		٠, ,,	336
Pseudo-China, Hb. M		vi.	310	Solandra, Sw	• • • • • • • • • • • • • • • • • • • •	
Pseudo-China, Roxb.			818	oppositifolia, Moon		88
		"	308	0	•	228
quadrata, A. DC		"	310	Q-1	•	229
retusa, Roxb		"	304			236
rigids, Wall	•••	"		acetosæfolium, Lamk	• •	
Roxburghiaus, Wall.	•••	"	811		. ,	237
Rozburghiana, Wall.	•••	"	306	agreste, Roth	. ,,	235
Rowburghii, Kunth	• •••	"	310	Anguivi, Bojer	. ,,	235
setosa, Miq	•••	12	306	angulosum, Heyne	. ,,	231
singaporensis, A. DC.	•••	"	813		,,	233
Thomsoniana, A. DC.	•••	,,	307	D _	,,	286
umbellata, Hb. Madr.		,,	310	barbisetum, Nees	. ,,	233
umbellata, Heyne		33	312	biflorum, Lour		232
vaginata, Done		,,	305	bistorum, D. Don	. ,,	232
Villandia, Ham		"	314	bigeminatum, Nees		231
virosa, Ham		"	289	Blumei, Nees		231
Wallichii, Kunth		"	313	Calleryanum, Dunal		232
Wallichii, Steud			304	calycinum, Nees	••	230
Wightii, A. DC		"	310	canaranum, Miq	•	286
i		"	809			235
zeylanica Well		,,	309	177	,,	236
seylanica, Wall seylanicà, Wight		,,			• • •	
		.??	810 149		. ,,	230
Smithia, Ait		ii.	148	cordatum, Forsk	• • •	287
abyssinica, Hochst.	•••	,,	149	orassipetalum, Wall.	•	232
aspera, Roxh	•••	"	151	crassipetalum, Wight	. ,,	281
bigemina. Dalz	•• .	. 17	149	Cumingii, Dunal	. ,,	235
blanda, Hohen	•••,	,,	150.	cuneatum, Moench	. ,,	235
blanda, Wall	•••	,,	151		,,	281
capitata, Dalz	•••	,,	150	decemdentatum, Roxb	. ,,	232
capitata, Desv		"	149		. ,,	232
ciliata, Royle	•••	,,	150	denticulatum, Bl		281
conferta, Sm		,,	149	denticulatum, Nees		231
dichotoma, Dals		į,	150	diffusum, Roxb	. ,	236
geminiflora, Roth		"	149	dulasmana Linu	. ,,	229
gracilis, Benth		,,	150	erianthum, D. Don		230
grandis, Benth		"	151	eriophorum, Dunal		233
hirsuta, Dalz	, '23		151		. "	
hispidissima, Zoll		"	149	3617		235
laxistora, Benth	• • • • • • • • • • • • • • • • • • • •	"	149	and bearing Daniel		229
		"	151	1		235
paniculata, Arn	•••	,,	TOT	esculentum, Dunai	. ,,	200

•						
Solanum	Vol.	Page	Solanum	,	Voi	Page
farinosum, Wall		233	pubescens, Willd.		iv.	230
ferox, Linn		233	pubescens, Kurz			231
f T	-	234			"	230
A . 1 10 . 1		229	pubescens, Roxb.		"	229
4 YT			Rhinocerotis, Bl.	•••	"	
flexuosum, Heyne	"	231	Roxburghii, Dunal	•••	"	229
giganteum, Jacq	99	233	rubrum, Miller		"	229
Gouakai, Dunal	"	232	Rumphii, Dunal		"	229
gracilipes, Done	,,	237	sanctum, Linn		"	236
heteracanthum, Danal	,,	23 5	sarmentosum, Nee	'š	,,	236
Heynei, R. & S	.,	235	sativum, Dunal		"	235
himalense, Dunal	,,	235	spirale, Roxb		,,	230
hirsutum, Roxb	19	233	stramonifolium, Da		,,	233
Hohenackeri, Van Heurck	•		stra nonifolium, Ro		"	234
& Muell	,,	234	subtruncatum, Wa		,,	231
Humboldtii, Willd	"	237	suffruticosum, Dune		"	229
incanum, Linn		235	torvum, Sw			234
2	,,	•229	triangulare, Lamk.		"	229
	,,	234			"	236
indicum, Linn	,,		trilobatum, Linn.	•••	"	
insanum, Linn	"	235	Trongum, Lamk.	•••	"	285
involucratum, Bl	,,	233	uliginosum, Bl	•••	"	229
involucratum, Kurz	٠,	233	undatum, Lamk.	•••	"	235
Jacquemonti, Dunal	,,	237	vagum, Heyne	•••	**	230
Jacquini, Miq	"	236	verbascifolium, Lii	nn	"	230
Jacquini, Willd	,,	236	villosum, Lamk.		"	229
Junghuhnii, Miq	,,	235	violaceum, Jacq.		,,	234
khasianum, Clarke	,,	2 34	virginianum, Juoq.		,,	236
læve, Dunal	,,	231	Wightii, Necs		"	234
lasiocarpum, Bl	,,	233	Wightii, Miq		"	234
lawum, Royle	"	229	xanthocarpum, Sch		"	
longum, Roxb		235	Wendl		17	236
Lycopersicum, Linn	"	237	zeilanicum, Soop.			235
7 4 701 1	"	229	Zollingeri, Dunal		"	232
	,,	232	s.p., Hk. f. & T.		"	234
	"	235	Solenanthus, Ledeb.		:"	159
Melongena, Linn	,•	236	angustifolius, Fisch	W	17.	159
Melongena, Wall	13					159
melanocarpum, Dunal	"	235	brachystemon, Fisch		. ,,	
membranaceum, Thw	,,	231	circinnatus, Ledeb.		"	160
membranaceum, Wall	"	231	lanatus, A. DC.	•••	"	159
membranaceum, Wight	"	261	sp., Hk. f. & T		.22	159
miniatum, Bernh	,,	229	Solenocarpus, W. &	A	ii.	27
mollissimum, Bl	"	232	indica, W. & A.		"	27
multiflorum, Roth	,,	235	Solenostigma consimile	e, Bl	v.	483
Necsianum, Dalz. & Gibs.	"	23 l	Wightii, Miq		. ,,	483
Neesianum, Wall	,,	231	Solenotinus, Oerst.		iıi.	7
nigrum, Linn	,,	229	Solidago, Linn		jii.	244
niveum, Vahl	,,	233	cuspidatus, Wall.		,,	296
nodiflorum, Jacq	"	229	densiflorus, Wall.		,,	35 5
Osbeckii, Dunal	"	232	floribundus, Wall.		,,	356
		235			,,	293
	"	229	nepalensis, D. Don			245
paludosum, Dunal	11	229	pubescens, Wall.		"	245
persicum, Willd	"	285	rubricaulis. Wall.		"	296
pinnatifidum, Roth	"				"	245
pressum, Dunal	"	235	Virga-aurea, Linn.	•••	**	257
Pseudolycopersicum, Jacq.	"	237	zeylanicus, Arn.	•••	::'	
Pseudosaponaceum, Bl	,,	234		•••	iiı.	418
Pseudo-undatum, Bl	"	235	arvensis, Linn.	•••	**	414
pterocaulon, Dunal	,	229	asper, Vill	•••	**	414

Sonouns	Vol.	Pags	Sonerila		Vol.	Page
calyculatus, Roxb	iii.		moluccana, Rosb		ii.	537
Candolleanus, J. & S	,,	415	Naudiniana, Miq	•••	,,	541
capitatus, Spreng	,,	417	nudiscapa, Kurz	•••	5,	539
cil atus, Lamk	,,	414	obliqua, Korth		,,	540
cyaneu, D. Don	,,	408	orbiculata, Lindl		,,	534
ferox, Wall v	"	414	paradoxa, Naud	•••	"	538
hastatus, Wall	,,	408	pedunculosa, Thw	•••	,,	531
longifolius, Wall	,,	414	picta, Griff		**	537
maritimus, Linn	,,	414	picta, Korth	•••	"	536
Metzianus, Schultz	,,	39 6	pilosula, Thw		• ,,	534
oleraceur, Linn	"	414	pumila Thw	•••	"	531
oleraceus, Wall	"	414	Rheedii, Wall	•••	,,	538
orizensis, Rozb	,,	414	rhomb folia, Thw	•••	,,	533
robustus, Wall	,,	408	robusta, Arn	•••	"	583
Royleanus, Wall	"	414	rostrata, Thw	•••	_ :,	533
rolubilis, Rumph	,,	335	Rottleri, Wall	ii.		531
Wallichianus, DC	"	414	rotundifolia, Bedd		ii.	534
Wightianus, DC	22	414	scapigera, Dalz	•••	"	538
Sonerile, Roxb	ii.	52 9	secunda, R. Br	•••	,,	536
acaulis, Bedd	,,	538	solanoules, Naud	•••	_".	534
affinis, Arn	,,	533	speciosa, Zenk	ıi.	. 53 I,	
amabilis, Kurz	"	539	squarross, Wall	•••	. 11.	537
amabilis, Triana	"	533	stricta, Hook	• • •	٠,	530
angustais, Triana	,,	536	tenera, Royle	• • •	, .	530
angustifolia, Roxb	.:-	537	tenera, Wall	•••	,,	53U
angustifolia, Wall	111.	42	tenuifolia, Bl	•••	"	536
arguta, R. Br	11.	537	tomentella, Thu	•••	,.	53 L
Arnottiana, Thw	"	53 L	travancorica, Bedd.	•••	٠,	534
axillaris, Wight	,,	535	Wallichii, Benn	•••	,,	538
hegoniæfolia, Bl	"	538	Wightiana, Arn	•••	۶.	532
Bensoni, Hk. f	"	540	versiculor, Wight	•••	"	585
brachyandra, Naud	"	530	violæfolia, Hk. f	•••	"	539
Brandisiana, Kurz	"	537	zeylanics, W. & A.	;::	- "	530
Brunonis, W. & A	,,	531	<i>sp.</i> , Griff	ii.		
bullata, Griff	"	540	SONERILEÆ	•••	ii.	513
burmannica, Wall	"	530	Sonneratia, Linn. f	•••	ii.	579
elegans, Wight	"	535	acida, Linn. f	•••	"	579
elegans, Hook	"	534	acida, Benth	• • • •	,,	580
emacula'a, Roxb	"	537	alba, Sm	•••	"	580
erecta, Jack	"	530 532	alba, Griff	•••	, »	580 579
firma, Thw	"	532	apetala, Ham	•••	"	580
Gardueri, Thw	n	540	evenia, Miq	•••	"	580
glaberiima, Arn	"	-535	Griffithii, Kurs	•••	"	580
grandiflora, Wall	••	539	lanceolata, Miq	•••	"	580
Griffithii, Clarke Harvey, Thw	"	533	mossambicensis, Klotz.	•••	"	580
	"	540	Preglecta, Bl	•••	"	580
Helferi, Clarke	"	540	obovata, Miq Pagatnat Mig	•••	,,	580
heterostemon, Naud hirsutula, Arn	"	534	Pagatpat, Miq Sophora, Linn	•••	;;	248
TT - Januaria and Assa	"	532		•••	11.	250
	"	539		•••	"	250
khasiana, Clarke Kurzii, Clarke	"	589	alopecuroides, Linn. glaucs, Lesch	•••	"	249
77	**	534	-1-1 TI	•••	"	249
	"	535	heptaphylla, Linn	•••	"	250
3 TT C	"	536	hentanhulla Wicht	•••	"	2 50
n al a a Baral	"	537	heptaphylla, Wight Houghiana, Wall	•••	"	250 251
maculata, Rheede	"	540	interrupta, Bedd	•••	"	251 251
	"		interrupta, Bead	•••	**	

Sophora	Vol.	Page	Sparganium vol. Page
mollis, Grah	ii.	251	stoloniferum, Ham vi. 490
Mooreroftiana, Benth	,,	249	Spartina phleoides, Roth vii. 236
robusta, Roxb	"	252	Spathiostemon javense, Bl v. 455
tomentosa, Linn	,,	249	salicinum, Hassk ,, 455
velutina, Lindl	"	249	Spathium microphyllum, Voigt vi. 565
violacea, Thw	"	249	Managarahuuh Pdaam 564
Wightii, Baker	"	250	undulatum, Edgew , 564
SOPHORUE	iï.	60	Spathodea adenophylla, A.DC. iv. 381
Sopubia, Ham	•	302	amana A DC 984
J-1-1:-:4-1:- (/ D		302	araugta Wight 990
admirate (C. Dans	"	302	
	"	302	
	?"	376	crispa, Bureau ,, 380
Sorbus Aucuparia, Linn	ii.		crispa, Dalz. & Gibs ,, 880
foliolosa, Done	"	376	crispa, Wall ,, 379
foliosa, Wenzig	11	377	Diepenhorsti, Miq " 379
lanata, Wenzig	77	375	falcata, Brand ,, 380
microphylla, Done	,,•	376	falcata, Wall ,, 380
nepalensis, Hort	"	375	gigantea, Bl ,, 384
sikkimensis, Wenz	,,	379	glandulosa, Bl ,, 383
ursina, Done	"	376	ignea, Kurz " 382
ursina, Wenzig	"	376	indica, Pers , 378
Sorghum, Hack	. vii.	181	Lobbii, Teysm. & Binnend. " 384
barbatum, Hochst	,,	272	longiflora, Vent ,, 379
? bicolor, Willd		184	P Loureiriana, DC " 379
capense, Heyne		182	Rheedii, Wall ,, 379
caucasicum, Griseb		176	Porlandia Corona 391
cernuum, Host		184	stipulata, Wall iv. 379, 383
1 1 0 17 - 1		182	velutina, Kurz iv. 379
4 2 D		185	
		182	
giganteum, Edgew	• • •	182	Spathodithyros suffruticosus,
halepense, Pers	• • •		Hassk vi. 374
halepense, Wall		185	Spathoglottis, Bl v. 813
Junghuhnii, Miq	, ,,	185	aurea, Lindl v. 813, vi. 191
muticum, Nees		185	Bensoni, Hk. f v. 814, vi. 191
nigrum (lapsu Andropog 👊	·) "	185	Fortuni, Lindl v. 814
parviflorum, Beauv		179	Handingiana, Par. & Rehb. f. ,, 815
purpureo-sericeum, Asch.	•		ixioides, Lindl ,, 814
& Schweinf	, ,,	186	khasiana, Griff ,, 814
Ritchiei, Munro	,,,	186	Kimbaliana, Hort vi. 191
saccharatum, Hohen		182	lilacina, Griff v. 813
saccharatum, Str. & Wint.	. ,,	184	Lobbii, Rchb. f v. 814, vi. 191
Schreberi, Tenore		182	parvifolia, Lind' v. 814
vulgare, Pers v.i.		, 184	010
Sorindeia madagascariensis			plicata, Bl , 813 plicata, Griff , 813
DC		7	pubescens, Lindl. v. 814, vi. 191
Sorostachys kyllingioides		-	pulescens, Wight v. 814
Steud	νi.	602	? trivalvis, Wall vi. 79
Southwellia nobilis, Salisb.	i.	358	Wrayi, Hk. f v. 813 vi. 191
Soyeria blattarioides, Monnier		394	Spatholobus, Hassk ii. 198
		394	104
	• •	567	1
Soymida, Juss		567	management Dough 109
febrifuga, Juss	:		, , , , , , , , , , , , , , , , , , , ,
Sparganium, Linn			
carinatum, Ham		49)	Roxburghii, Benth, 193
erectum, Kurz	"	490	Speirema montanum, Hk.f.&T. iii. 423
ramosum, Huds		490	Spergula, Linn i. 248
simplex, Huds	. ,,	490	æstivosa, Koen " 251
VOL. VII.			вb

S			_	· Only and has	
Spergula arvensis, Linn			Page 243		Page 275
	•••	1.	243	112 W	275
	•••	"	244	2 72 327211.3	275
rubra, Dietr Spergularia rubra, St. Hil	•••	;"	244	Inciniatus Wall	276
		1.	62	mismesonhalus DO	275
Sperlingia opposita, Vahl verticillata, Vahl	•••	1 V .	62	migragan balan Willd	275
	•••	iii.	199		275
Spermacoce, Linn	•••		200		275
angustifolia, Wall articularis, Linn. f	•••	"	201	Transaction of the same	274
	•••	"	201		275
. TO	•••	"	130	zeylanicus, Wall ,, Sphæridiophora abyssinicu »,	2.0
70 100	•••	"	201	1 ~ * * * * * * * * * * * * * * * * * *	92
	•••	"	201	Jamifoliaum Dager	92
777 14	•••	"	75		. 246
D	•••	"	201	Sphærocurya edulis, Wall v.	230
corymoosa, Burin		"	129	leprosa, Dalz i. 570, v	
costata, Roxb		"	58	1 1 1 2 20	235
exserta, Roxb		"	129	restita, Wall ,	.230
filina, Wall		"	200	Wallichiana, W. & A ,,	234
Gardneri, Wall		"	200	Spherocaryum, Nees vii	246
glabra, Roxb		"	59	elegans, Nees ,,	246
? hedyotidea, DC			201	Spherochloa quinquangularis	
hirta, Rottl	•••	iii.	201		582
hispida, Linn	•••	11	200	Sphæromorphæs, DC iii.	~
hispida, Miq	•••	"	59	Centipeda, DC ,,	317
lasiocarpa, Br		"	200	Russeliana, DC ,,	317
læris, Roxo		"	130	Sphærophysa pycnorhiza,	
P lineata, Roxb		,,	59	Beuth ii.	119
longicaulis, Wall		,,	201	Sphærosacme decandra, Wall. i.	562
ocymoides, Burm		"	200	fragans, Wall "	562
ocymoides, Wall		,,	20 0	? laxa, Wall ,,	560
P procumbens, Liun.	•••	"	201	paniculata, Wall ,,	560
pusilla, DC		"	2 00	polystachya, Wall ,,	559
pusilla, Wall ramosa, Wall	•••	"	200	Rohituka, Wall "	560
	•••	"	200	spectabilis, Wull ,,	561
ramosissima, Wall	•••	"	201	spicata. Wall "	559
Rowburghiana, Wall.	•••	"	200		663
Roxburghii, Spreng.	•••	"	130	Wallichii, Arn. & N. es ,,	668
scaberrima, Bl	•••	"	201	Sphærostema axillare, Bl 1.	45
scalra, Willd	•••	>>	201	elongatum, Bl ,,	44
stricta, Linn. f	•••	"	200	grandiflorum, Hk. f. & T. "	44
stricta, Schlecht	•••	"	200	grandiflorum, Wall "	44
sumatrensis, Retz	•••	"	129	propinquum, Bl "	45
sumatrensis, Roxb	•••	"	131	Sphalanthus confertus, Jack 11.	460 437
tenera, Wall P teres, Roxb	•••	"	200 129	Sphenocles, Gaertn ii'.	438
	•••	"	200	Pongatium, A. DC ,,	438
triandra, Ham tubularis, Br		ΰι,		zeylauica, Gaertn ,, sp., Griff ,, ,,	438
			199		600
Spermadictyon azureum, Wa	a]]	Ξ',	197	manuscript and market 187 descripts	602
			197	1 1	60 L
Charles and All and The Company	 i	ii.	274	annachaides Vous	601
	•••		275	Communication of Market	601
A 1 (Mr. 11			275	Griffithiana, Wight ,,	602
		••	275	grossa, Kurz ,,	60T
			274	Jackiana, Schau ,,	602
1.4 \$37.31.3		,,	275	Jackiana, Wight ,,	602
		••			

Sphenodesma	V1	Page	Spirms		Wala	Do
microstylis, Clarke			nepalensis, Lodd	•••	ii.	Page 326
paniculata, Clarke		COO	nutans, Royle		",	326
pentandra, Jack	••	602	parvifolia, Bertol		"	326
trilors, Wight		601	pulchella, Kunze		"	326
unguiculata, Schau		601	rhamnifolia, Wall		• • •	325
Wallichiana, Schau		602	sorbifolia, Linn		"	324
? sp., Wall	• • • • • • • • • • • • • • • • • • • •	601	stellata, Wall		"	324
Sphinotacanthus. Benth	iv.	544	triternata, Wall		323,	
Griffithii, Benth	"	544	vaccinifolia, D. Don	•••	ii.	325
Sphragidia zeylanica, Thw.	ν.	341	P vaccinifolia, Lodd.		,,	826
Sphyranthera, Hk. f	v.	477	venustula, Kunth & Bou			826
capitellata, Hk. f	"	477	vestita, Wall		17	323
Spicillaria Leschenaultii,	"		SPIREE		íi.	307
Rich	iii.	120	Spiranthera pentaphylle			
Spilanthes, Linn	iii.	307	Bojer		iv.	202
Acmella, Linn	17	307	Turpethum, B. jer	•••		212
calva, DC	"	307			102,	
calva, Wight	,,	307	amæna, Bunge	•••	vi.	102
oleracia, Jacq	"	307	australis, Lindl		"	102
paniculata, DC	"	307	australis, Wight		"	103
Pseudo-Acmella, Linn	"	307	autumnalis, Rich	•••	"	103
Spina spinarum, Rumph	í.	193	densa. A. Rich		"	103
Spinacia, Linn	v.	5	flexuosa, Lindl		"	102
oleracea, Linn	"	6		•••	"	102
tetrandra, Roxb	"	6	7 77 (1	•••	"	130
tetrandra, Stev	"	6	7 77 6	•••	"	131
Spinifex, Linn	vii.	63	37 77 11 171	•••		102
dioicus, Ham	,,	63	1/4 T 1 11	•••		102
squarrosus, Linn	"	63		•••		102
Spiradiclis, Bl	iii.	76	unalaschcensis, Sprong.			130
bifids, $H\dot{k}$. $f_{\underline{k}}$,,	76	T472 1 42 T 2 41		,,	103
cæspitosa, Bl	"	76	`O • OP '			102
cylindrica, Hk. f	"	76		F.		
	ii.	323			vi.	557
Spiræa, $Linn$ arcuata, Hk . f	,,	325			,,	557
argentea, Loud	"	326	pleioirrhiza, F. Muell., vio	le		
Aruncus, Linn ii.	323,	389	Lemna		,,	557
barbata, Wall	ji.	389			,, !	55 7
bella, Sims	"	324			v.	2
brahuica, Boiss	"	326	Spirostemon spiralis, Griff		iii. (350
callosa, Thunb	,,	324	Splitgerbera macrostochy	a,		
callosa, Wall	"	324	Wight	• •		578
canescens, D. Don	,,	325	scabrella, Dalz. & Gibs	••	"	578
cantoniensis, Lour	,,	326	Spodiopogon, Trin	1		108
chamædrifolia, Linn	"	326			,,	108
chamædrifolia, Hk. f. & T.	,,	326	angustifolius, Trin. vi. 60	54,	vii.	129
cærulescens, Poir	,,	326	Blumii, Nees	1	rii.]	
corumbosa, Roxb	,,	326	ciliaris, Nees	••	,,	133
cuneifolia, Wall	"	325		••	"	131
expansa, Wall	,,	324		••	"	108
fastigiata, Wall	"	324		••	,,	108
Fortuni, Planch	,,	324		••	"	129
glauca, Wall	"	324		••	"	139
kamtschatica, Wall	,,	323		••		129
luxiflora, Lindl	"	325		••		133
Lindleyana, Wall	,,	324		••	"	139
miorantha, Hk. f	,,	325	pilosus, Nees	•••	,,	130
			•			

796	GENERAI	index.
6		Guardalan
Spodiopogon	Vol. Page	Sporoholus Vol. Page
rivalis, Thw	. vii. 135	pungens, Kunth vii. 249
scrobiculatus, Nees	100	, , , , , , , , , , , , , , , , , , , ,
semisagittatus, Steud	" 104	A
villosus, Nees	" 104	, , , , , , , , , , , , , , , , , , ,
seylanicus, Nees	10×	TTT 111 1 11 76
sp., Hk. f. & T		
sp., Wall vii. 126	** 40	
Spondias, Linn	40	sp., Wall vii. 42, 247, 248, 249,
acuminata, Rowb	. 40 l	250, 251, 2°2, 256
amara, Lamk	. " 40	Springia indica, Muell. &
axillaris, Roxb	" 40	Van. H iii. 670
dulcis, Willd		STACHYDEE iv. 606
elliptica, Rottl	40	Stachyopogon pauciflorus, Klotz vi. 264
? macrophylla, Wall	. " 40	outestus Vlota 984
mangifera, Willd		
simplicifolia, Rottl		
	. ii. 12, 42	· A D
SPONDIEÆ		07F
Sponia amboinensis, Done	404	
amboinensis, Miq	" 494	,,,
angustifolia, Planch		allam midalim Damah 275
annulata, Teysm. & Binn Burmanni, Planch	. 404	
	" 404	F
Griffithii, Planch	" 494	270
orientalis, Planch	" 40¢	comican III/all C75
subserrata, Kurz	" 100	and and an a Wall 875
timorensis, Done	. " 404 [splendens, Wall ,, 675 sylvatica. Lian 676
velutina, Miq	7 404	
velutina, Planch	" 400	and the same
virgata, Planch	404	on TIL C & M GCM
Wightii, Planch	" I	sp., Hk. f. & T ,, 677 Stachytarpha, viae seq.
Sporobolus, Br	940	O 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
angustus, Buokl	" 0"0	
arabicus, Boiss	" 959	indian Caban " EQA
capillaris, Arn ciliatus, Munro	" 051	immeianneis Sahan 594
- '1 '4 D1	. oro	iamaiamaia Wahl 504
 .•	" 050	meticifalia Dala & Ciba KGA
commutatus, Kunth coromandelianus, Kunth	" 950	millora Tranca SAS
	" 947	
diander, Beauv discosporus, Nees	950	Stachyurus, S. & Z i. 288 himalaious, Hk. f. & T , 288
.1 Ď	" 040	Stadmannia pubescens, Spreng. i. 681
	" 950	trijuga, Spreng ,, 681
geniculatus, Nees glaucifolius, Hochst	" 9KA	Stagmaria verniciflua, Jack? ii. 25
humifusus, Trim	" 051	Stalagmites ovalifolius, G. Don i. 269
iii	947	Stapelia adscendens, Roxb iv. 76
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	" 040	Callematic Hom
7	" 040	involvement Hanh Made " 47
1/44 1/2 17 41.	" 6 40	umballata Dorb
minor, Kunth	" 040 l	Staphyles, Linn i. 698
minutiflorus, Link	940	Wmodi Wall 608
orientalis, Kunth	" 951	india D ' 607
orientalis, Trim	″ 95A	Anifolia Tima
	" OF 1	9
pallidus, Boiss	" 050	Statice, Linn iii. 479
piliferus, Kunth	" OE1	cobulton Daise 400
pulchellus, Br	" 959	Wcopodioides, Gir ,, 479
	,,	

Statice	Vo	l. Page	Stellaria	•	vđ.	Page
macrorrhabdos, Boiss	ıii	. 480	umbellata, Turoz.		, i.	234
	,,	430	Webbiana, Edgew.	Y Hk. f	. ,,	230
TT1 A	,,	100	Stellera, Linn			196
STATICER	iı	i. 478	altaicz, Thieb			196
Stauntonia angustifolia, Wu	II. i.	108	Chamæjasme, Linn			196
77 * 717 11	,,	160	concinna, Edgew.		•••	196
7 4 * 7 * * * * * * * * * * * * * * * * *	,,	1/10	hypericifolia, Endl.			196
	iv		Passerina, Linn.		•••	194
9 19 21-21 (711		372	Stemodia, Lina		•	265
1141 273 41	,,	371	aquatica, Willd.			269
	"	371	arvensis, Steud.		"	265
	,,	371				266
umbross, Clarke	;		balsamea, Benth.		"	264
Stauritis violacea, Rohb. f.				•••	"	
Staurogyne angustifolia, Wal			caritata, Benth.	•••	"	261
argentea, Wall	,,	398	cimicina, Benth.		"	267
sp., Wall	. ,,	398	cærulea, Benth.	•••	"	263
Stauropais, Rchb. f	v i	.• 27	diffusa, Benth		,,	268
giganteus, Benth	,,	27	grandiflora, Ham.		,,	261
undulatus, Benth	. "	27	gratioloides, Benth.		"	267
Stryoasia cochinchinensis,			hirsuta, Heyne		,,	269
Lour	. vii	. 156	hypericifolia, Benth		11	269
Stelechocarpus, Bl	. i.	47	lutea, Moon		"	264
Burahol, Bl	. ,,	47	macrostachya, Bentl	b	"	262
Stelis caudata, D. Don		758	1		"	265
hirta, Sm		762	Menthastrum, Benth		"	266
odoratissima, Sm		758	micrantha, Benth.			267
O. 11 . F.		229	1 . 4		"	281
		229	muraria (muralis), 1		"	252
	•	233	philippensis, Cham.		"	261
aquatica, Poll		-) " " n (1		"	266
bulbosa, Wulf		231		··· . ···	"	
cerastioides, Linn	. ,,	227	. '		00:	262
crispata, Wall	. ,,	229			265,	
decumbens, Edgew	. "	234			1V.	266
depauperata, Ediew	. ,,	234		•••	,,	266
drymarioide-, Thw	. ,,	229		•••	"	266
Fenzliana, Klotz	. ,,	232			11	266
glauca, With	. ,,	233	? tomentosa, G. Don	•••	"	259
graminea, Linn	. ,,	233			"	265
lanata, Hk. f		232	sp., Griff		"	261
latifolia, Edgew. & Hk. f.	"	231	Stemona, Lour		٧ı.	2 98
longissima, Wall		232	Curtisii, Hk. f		,,	293
media, Linn		230	gloriosoides, Voigt .		,,	298
media, Wight		2:9	Griffithiana, Kurz		"	299
mollis, Klotz	••	232	minor, Hk. f		"	298
monogyna, D. Doa	• • • • • • • • • • • • • • • • • • • •	230				298
monosperma, D. Don		229	Stemonoporus affinis, T		í.	814
	•••	229	canaliculatus, Thw			315
		232	. v 7 . ////		"	814
patens, D. Don	•••	234	2 1 700		"	315
petræa, Búnge					**	316
petræa, Hk. f. & T		234			••	316
saxatilis, Ham		232		•• •••	••	
semivestita, Edgew	. ,,	230		•• •• •	**	315
sikkimensis, Hk. f	. ,,	230		•••	"	315
subumbellata, Edgew	,,,	233		•••	"	316
thymifolia, Wall	٠,,	233		•••	"	815
tibetica, Kurz	٠,,	231			"	314
uliginosa, Linn		233	Stemonurus affinis, Mis	r s	1,	587

Stemonurus (Vol	. Page	1		Vol.	Paga
apicalis, Miers i.		Stephanotis, Thouars		iv.	38
axillaris, Miers ,,	586	Maingayi, Hk. f	•••	••	39
ceylanicus, Miers ,,	596	Stephegyne, Korth		iii.	25
coriaceus, Miers ,,	KRR	diversifolia, Hk. f		,,	26
? crassipes, Kurz ,,	EQ7	parvifolia, Korth	•••	,,	25
? fætidus, Wight ,,	EQU	tubulosa, //k. f	•••	,,	25
Gardneri, Miers ,,	59 0	Sterculia, Linn		i.	354
Heyneanus, Miers ,,	5QQ	affinis, Mast	•••	,,	361
longifolius, Miers ,,	KRR	alata, Roxb		,,	360
penangianus, Miers ,,	587	alata, Wall	٠	,,	356
polymorphus, Miera ,,		angustifolia, Jack	•••	,,	358
prasinus, Bl ,		angustifolia, Roxb	•••	,,	358
secundiflorus, Bl ,		nrmata, Mast		,,	357
P tomentellus, Kurz ,		Balanghas, Lian	•••	"	358
Walkeri, Miers		Balanghas, Roxb	•••	"	358
Stenactis bellidioides, Nees ii		bicolor, Mas'	•••	,,	359
multiradiata, Lindl,		campanulata, Wall.	!».	"	362
Stenarrhena lanata, D. Don iv		coccinea, Roxb	•••	"	°357 357
Stenaster, sp v		coccinea, Jack	•••	"	360
Stenochasma convolutum, Griff. vi	236 237	coccinea, Wall	•••	"	359
urceolare, Griff ,, Stenosiphonium, Nees iv		colorata, Roxb	•••	"	356
annfantam Mass	497	cuncata, Heyne ensifolia, Mast	•••	"	359
and fautain T Andona	497	fortide Time	•••	"	354
diandene Wight	AOR	August 117-11	•••	"	360
	499	C. J 337 - 11	•••	"	360
manuidanum T Andaus	499	guttata, Roxb	•••	"	355
Russellianum, Nees	497	Heynii, Bedd	•••	"	360
Russellianum, Wight,	497	Jackiana, Wall		"	358
setosum, T. Anders ,	497	lævis, Wall		"	357
subsericeum, Nees	497	lancerfolia, Roxb	•••	"	356
zeylanicum, T. Anders ,	415	lanceolata, Ham	•••	"	357
Stenosolenium perenne,	•	linearicarpa, Mast		,,	360
	r. 177	linguifolia, Mast	• • • •	,,	357
Stenotaphrum, Trin vi	i. 90	macrophylla, Vent	•••	,,	356
americanum, Schrank ,	, 90	Maingayi, Mast	•••	,,	359
complanatum, Schrank ,	, 90	mollis, Wall	•••	,,	358
dimidiatum, Brong,		nobilis, Br	•••	,,	358
glabrum, Trin ,		ovalifolia, Wall	•••	,,	356
Helferi, Munro ,		parviflora, Roxb	•••	,,	359
Koenigii, Schrank ,		parvifolia, Wall	•••	"	356
madagascariense, Kunth,		populifolia, Rozb	•••	"	361
sarmentosum, Nees ,		populifolia, W. & A.	•••	"	361
Swartzianum, Nees ,		pubescens, Mast	•••	"	357 364
sp., Wall ,		punduana, Wall	•••	"	356
Stephania, Lour i	. 103	Roxburghii, Wall rubicunda, Wall	•••	"	360
elegans, Hk. f. & T ,	109		•••	"	358
glabra, Miers ,	109		•••	"	361
glandulifera, Miers , hernandifolia, Walp ,	109	scaphigera, Wall striatiflora, Mast	••	"	356
L Miana	103	Thwaitesii, Mast		"	361
. Landanda Wilson	109	tubulata, Mast	•••	"	362
iamonica Miera	' ነበሩ	nrens, Roxb	•••	"	355
latifolia, Miers ,	102	versicolor, Wall	•••	"	355
longa, Miers ,	103	villosa, Roxb	•••	"	355
rotunda, Lour ,	109	STERCULIACEA		i.	353
Roxburghiana, Miers	102	STERCULIEZ	•••	j.	353
- ,	•				

•	v	ol. I	age	Stipa		•		l. P	
Stereochilus, Lindl	• • • • •	٧i.	33	comata, Tr	in, & Ru	pr	vi	i. 2	
hirtus, Lindl		12	35	concinna,	Hk. f.		,		23U
			612	Duthiei, H	lk. f		,	, 2	232
Stereospermum, Cham.			382	erecta, Ho	rt. Madr.			•	230
1 1 11 11 11			382	eriocaulis,			,	•	430
	•••	"	383	gallica, Ja			,	•	230
fimbriatum, DC	•••	"		Grafiana,			-	•	230
? Ghorta, Clarke	•••	"	384	Hookeri,			-	' ;	232
glandulosum, Miq	•••	,,	383				,	' (231
nypostictum, Miq	•••	,,	384	humilia, B			,	٠.	232
neuranthum, Kurz		,,	382	Jacquemo		-		,	
serrulatum, DC		,,	3 80	juncea, La		•••	••• •	,	230
suaveoleus, DC		"	382	Lagascæ, (٠٠, ,	, 2	230
? Wallichii, Clarke		"	383	littorea. B		•••	,	,	63
xylocarpum, Wight		"	383	mongolica		•••	,	, .	229
sp., Hk. f. & T	•••	"	585	orientalia	, Trin.	•••	,	,	229
Steudnera, C. Koch		۷,	519	orientalis,	Trio.		,	,	233
			520	Orthorapl	nium. Ste	ud.		,	233
assamica, Hk. f	•••	٠,	521	palearea,	Sibth. &	Sm.		,	231
capitellata, Hk. f.	•••	"	520	pallida, N	innro	•••		,	231
colocasiæfolia, C. K. ch		"		pennata,					230
colocasiæfolia, Hk. f.	•••	"	520	pulcherrin				,,	230
colocasioides, IIk. f.	•••	"	520					,	229
discolor, Hort	•••	"	520	purpurea	, unaec.			"	229
Griffithin, Schott		"	520	Richteria	ia, iik. t.			"	232
Stichoneuron, Hk. f		VI.	۶99	rotusta, I		•••	•••	"	
membranaceum, Hk. f.		,,	2 99	sareptana		•••	•••	"	231
Stictophyllum glabrum, Ed	gew	. iii.	382	Semenovi	, Krassu.	•••	•••	"	229
Stigmarota (Stigmar	osa)			seminuda	, Vahl	•••	•••	,,	231
Jangomas, Lour		i.	193	sibirica,	Lamk.	•••	•••	"	231
		٧.	358	Spinifex,	Linn.	•••	•••	,•	63
Stilago Bunius, Linu	•••		361	splenden			•••	,,	232
diandra, Roxb	•••	"	361		na, Duthi	ie		,,	229
lanceolaria, Roxb	••	"			Jacquen		•••	,,	229
tomentosa, Roxb	•••	."	357	tauricola		 ••••	•••	"	230
Stilbanthus, Hk. f	•••	ıv.	729				•••		230
scandens, Hk . f		"	729	Tirsa, St	B V	•••		"	231
Stillingfleetia sebifera,	Boj.	v.	470	tortilis, l		•••	•••	"	231
Stellingia Agallocha, I	Baill.	v.	472		is, Lamk.		•••	١,	231
asperococca, Baill		"	475	ukranica		•••	•••	,,	
bingyrica, Baill		,,	471		, Krassn.		•••	**	231
Chamælea, Baili	•••	,,	475	Stipellaria	mollis, B	euth.	•••	▼.	420
discolor, Champ		"	469		ı, Benth.		•••	,,	421
himalayensis, Klotz.		471	, 473	villosa, P	enth	•••	•••	,,	421
himalayensis, Kiow.		٧.	471	Stomatocal	ya Grif	Kthiar	ıus,		_
indica, Baill	•••		470	l Moell.		•••		₹.	468
paniculata, Miq	•••	"	470	Strabonia	anaphalo	des, l	DC.	iii.	299
sebifera, Michx	•••	"		Stracheya,	Benth.	•		ii.	147
sinensis, Baill	•••	"	470	tibetics,	Ronth.	•••	•••	,,	147
viryata, Baill	•••	"	471	Strakæa me	Lastomef	olia F	res	Ÿ.	73
Stipa, Linn	•••	VII		Stramoniu		m (ta	at th	iv.	
altaica, Trin		,,	233		m vuigavu			ii.	382
aperta, Janka			230	Stranvæsi	a, Linai.	,,	•••		382
appendiculata, Janka			230	glaucero	ons, Line	· · · · ·	•••	"	
			211		ens, Done		•••	"	883
			227		Done		•••	"	383
aristoides, Stapf			229	STRATIOTE	Æ		• • • •	٧.	658
basi-plumosa, Munro	•••		233	1	acoroides.	Linn	ı, f.	٧.	663
breviflora. Griseb			011	alismoid	es, Linn.			,,	662
capensis, Nees			994		n Juss.	•••		ii.	508
capillaris, Gronov		. ,,		No according	tum, Wa	11	•••	99	508
canillata, Linn		, ,,	230	acumino				"	

Stravallium C	Vol.	Page	Vol. Page
acutangulum, Miers		508	Strobilanthes, Bl iv. 429
album, DC	. ,,	507	acrocephalus, T. Anders ,, 454
angustum, Wall		509	acuminatus, T. Anders ,, 430 acuminatus, T. Anders ,, 45
demissum, Miers		503	acuminatus, T. Anders ,, 4.5
globosum, Miers	٠ "	508 r	adenophorus, Bedd ,, 440
gracile, Miera	. ",	£08	adenophorus, Nees ,, 437
obtusangulum, Miers		508	adnutue, Clarke ,, 436
Rheedii, Miers		508	agrestis, Clarke ,, 466
rubrum, DC		507	alatus, Nees ,, 464
rubrum, Wall	• ,,	508	amabilis, Clarks ,, 476
Streblosa tortilis, Korth	. jiı.	169	amplectens, Nees ,, 453
Streblue, Lour	. v.	489	anceps, Nees ,, 442
asper, Lour	٠,,	489	Andersonii, Bedd ,, 450
mitis, Kurs	. ,,	489	angustifrons, Clarke , 466
taxoides, Kurz	٠ ,,	488	anisophyllus, T. Anders , 462
seylanica, Kurz		488	argutus, Nees ,, 474
Streptachne? sp. Wall		233	Armottianus, Nees ,, 442
Streptia crinita, Rich	. vii.	833	asper, Wight ,, 452
secunda, Rich		333	asperrimus, Nees ,, 443
Streptium asperum, Roxb	_	665	asperrimus, Dalz. & Gibs. ,, 444
Streptocaulon, W. & A	. iv.	.9	atropurpureus, Nees ,, 472
calophyllum, Wight	. ,,	12	attenuatus, Nees iv. 414, 464
extensum, Wight	., ,,	11	auriculatus, Ness iv. 453
Griffithii, Hk. f	. ,,	10	barbatus, Nees ,, 437
Hamiltonii, Wight		11	Beddomei, T. Anders ,, 474
Horsfieldii, Miq		11	biceps, T. Anders ,, 429
Kleinii, W. & A		.9	boerhavioides, T. Anders. ,, 469
sylvestre, Wight	•••	10	bolamputtensis, Bedd ,, 451
tomentosum, W. & A	• • • • • • • • • • • • • • • • • • • •	10	Brandisii, T. Anders ,, 448
Walliohii, W. & A		9	Brunonianus, Nees ,, 457
Streptogyna, Brauv			selleens Ness 451
orinita, Beauv		333	anlloone Noon 451
guianensis, Rich		333 389	animoinus T Anders 450
	vi.	389	1 Lucimus Nass
· · · · · · · · · · · · · · · · · · ·	,	389	1 annuage 1 state Winds
	:		Aga Aga Aga
1 1 177 11	Vi.	322 322	1 annihadana (11 A.: 1 " AFO
	,,	360	aamdahaa (f) 4 - 3 441
	,,	3 60	anninthaidea Naan 474
	,,	322	Ohammioni T Andors 469
Streptostigma viridiflorum, I	 "h₩"i		dilineana Mass. 490
	iv.		ciliatus, T. Anders ,, 439
- i		299	collinus, Nees ,, 465
3! A TO 41	·· ,,	299	coloratus, T. Anders ,, 478
	., ,,	299	coloratus, Nees iv. 443, 450
alahanta Danth	•••	299	consanguineus, Clarke iv. 435
Lineard Donals	•	299	consanguineus, T. Anders. iv. 432, 435
lmhan Ž		299	crategifolius, T. Anders. iv. 468
37	"	800	crinitus, T. Anders ,, 478
	,,	299	crispus, T. Anders 446
orobanchoides, Benth		299	cuspidatus, T. Anders ,, 435
	,,	299	Dalhousianus, Clarke ,, 460
pusilla, Hochst,		299	Dalzellii, T. Anders ,, 413
sulphurea, Dalz. & Gib)s. ,,	300	dasyspermus, Kurs , 461
Strobidia conchigera, Kunt	ze vi		debilis, Clarke ,, 467
Strobila kispidissima, G. Do			P decurrens, Nees ,, 440
			**

Strobilanthes	Vol	Page	Strobilanthes	•		₩.	D
decurrens, T. Anders	iv.	486	Karensium, Kurs			voz. iv.	Page 449
deflexus, T. Anders		433	khaeyanus, T. And				436
densioulatus, T. Anders.	"	465	Kunthianus, T. An		•••	"	434
discolor, T. Anders	"	462	lachenensis, Clark			"	465
divaricatus, T. Anders	"	468			•••	"	467
Dupeni, Bedd	,,	453	lamiifolius, F. And	···	•••	"	463
durus, T. Anders	"	447	lamiifolius, T. And		•••	"	463
echinatus, Nees	"	447	lamioides, T. Ande		•••	, "	477
Kdgeworthianus, Nees	"	453	Planatus, Nees		•••	"	477
alian makana (Marilia	"	470	lanceolatus, Nees	•••	•••	"	437
eriocenhalus T. Anders	"	444	lancifolius, T. And		•••	"	465
eriocephalus, T. Anders exareolatus, Clarke	"	432	laxus, T. Anders.		•••	"	450
exsertus, Clarke	"	445	longipes, Clarke	•••	•••	"	455
extensus, Nees	"	463	lupulinus, Nees	•••	•••	"	443
amaamaaa Dadd	"	464	lumilinus T Ande	···	:	443,	
101-1	"	449	lupulinus, T. Ande lupulinus, Benth.				
farinoss, Clarke	".		luridas, Wight		•••	ì♥.	444 450
45	,,•	447	Maclellandi, Clarke		•••	"	
finition T Anders	"	456			•••	"	458
fimbriatus, T. Anders fimbriatus, Kurz	"	456	macrostachyus, Bei macrostegius, Clar		•••	"	442
A i difalima N	,,	468			•••	"	456
4	,,	468		•••	•••	"	457 458
Α 17	"	426	maculatus, T. Aude Maingayi, Clarke		•••	"	448
# 12 3 2 2 17 17	"	431	Mastersi, T. Ander		•••	29	476
and the second second	"	433	micranthus, Wight		•••	"	444
Gardnerianus, T. Anders Gardnerianus, T. Anders.	"	446	microcarpus, T. An	 	•••	"	
	"	459	mońadelphus, Necs	wers.		"	466
	"	447	multidens, Clarke		•••	"	457
	"	467	mysurensis, Noos	•••	:	477	46l
glandulosus, Kurz glaucescens, Nees	71	425	Neesianus, Wight	•••		477,	
	,,	448			•••	1₹.	
	,,	458	Neesii, Kurz		•••	"	476
glutinosus, Nees glutinosus, Grah	"	444	neglectus, T. Ander neilgherrensie, Be		•••	"	435 438
glutinosus, Grah Gordjussia, Dalz. & Gibe.	"	462	Newii, Bedd		•••	"	464
gossypinus, T. Anders	"	434	nigrescens, T. And		•••	"	433
717 11 1.1	"	474	nobilis, Clarke		•••	"	471
	"	459	nutans, T. Anders.	•••	•••	••	454
	,	451	oligocephalus, T.		•••	"	461
Griffithianus, T. Anders.	"	470	pallidus, T. Auders		rs.	"	440
haplanthoides, T. Anders.	"	476	Panichanga, T. An		•••	"	473
Helferi, T. Anders	"	456	paniculatus, T. And	love	•••	"	475
	,,	475	paniculatus, Bedd.			"	475
77 - 11 - 4 (T) - 4 7	"	469	papillosus, T. And	···	•••	"	415
hereremelles T. Anders	"	437	Parishii, Clarke		•••	"	431
heteromallus, T. Anders. heteromallus, T. Anders.	"	426	parviflorus, Bedd.	•••	•••	"	439
Herronaus, 1. Angels.	"	443	paucinervius, T.		•••	"	47U
Heyneanus, Nees	,,		pauper, Clarke		ъ.	"	463
hirsutissimus, Necs	"	474	pectinatus, T. And		•••	"	417
homotropus, Nees	"	474				"	460
Hookeri, Nees a	,,	449	pentstemonoides, I			•••	-
hypoleucus, T. Anders	"	432	pentstemonoides. T. perioliutus, T. And			•••	460 458
imbricatus, Nees	17	455 471			•••	"	
inflatus, T. Anders	"	471	Perrottetianus, No		•••	"	439 458
interruptus, Benth	"	474	petiolaris, Nees	•••	•••	"	457
involucratus, Bl	"	414	petiolaris, Nees		•••	"	464
isophyllus, T. Anders	,,	462	phyllocaulos, Clark		•••	"	446
ixiocephalus, Benth	"	414	phyllostachyus, Ki		•••	"	453
jeyporensis, Bedd	"	4 36	plumulosus, Nees	•••	•••	"	100

Strobhanther	Vol.	Page	. v e	ol. Page
polythrix, T. Anders	iv.	456	Stroemeria tetrandra, Vahl	i. 172
pterocaulis, Kurz	. ,,	455	1 4	, 172
pulcherrimus, T. And rs		475		i. 576
pulneyensis, Clarks	•	438	ceylanica, Gard	,, 579
punctatus, Bedd		438.		v. 23 5
punctatus, Nees		442		i. 579
quadrangularis, Clarke	• • •	460		,, 579
reflexus, Nees		464	Strongylocalya hemisphericus,	
remotus, T. Anders		476		ii. 477
rhamnifolius, T. Anders,		433		i. 190
" rhombifolius, Clarke		461		,, 191
- L L'	••	432		ii. 655
TTT 11	-	429	1 1 . 177. 14	,, 656
1 / 1 / 1		469		5, 656
	• • •	475		i. 655
rubicundus, T. Anders		475	1 7 7 4 337.31	858
	-	430		" ess
rufescens, T. Anders	• • • • • • • • • • • • • • • • • • • •	443		" GEE
rugosus, Wight	•	454	T1-1 177-11	" CEG
Sabinianus, Nees	• • • • • • • • • • • • • • • • • • • •	429	Tour de la Company Maria	235
salicifolius, T. Anders	• • • • • • • • • • • • • • • • • • • •	446		" GIE
scaber, Nees	•		T J D & O	" GEE
scaber, T. Auders		426	W. 112-1-22 4 D.7	" RSK
scrobiculatus, Dalz	. ,,	445	XXY:-1-1: TXY-11	" CEC
secundus, T. Anders		468		,, 656
	. 4 2		,	i. 582
sessiloides, Dalz. & Giba	. iv.	452	1	▼. 86
sessiloides, Wight	. ,,	452	acuminata, Wall	,, 86
sexennis. Nees	. ,,	474		, 89
sexennis, Bedd	. ,,	474		, 89
Simonsii, T. Anders	. ,,	447		" 87
spiontus, T. Anders	. ,,	477		, 88
stenodon, Clarke	. ,,	432		,, 87
stenophyllus, Clarke	, ,,	472	bicirrhosa, Lesch	,, 87
subcapitatus, Clarke		455	oinnamomifolia, Thw	,, 89
subnudatus, Clarke		472	colubrina, Linn	,, 87
subflaccidus, Kurz		430	colubrina, Bl	,, 88
tamburensis, Clarke		454	colubrina, wall iv.	88, 90
tener, Nees		443	coriacea, Thw i. i	v. 89
tetrapterus, Dalz		437	Dalzellii, Clarks	,, 87
Thomsoni, T. Anders	• • • • • • • • • • • • • • • • • • • •	467	Gautheriana, Pierre	,, 89
Thwaitesii, T. Anders	**	441		,, 86
trifidus, Nees		443	Lamana Manka	,, 86
tristis, T. Anders	•••	441	l Tanadii Dannina	,, 88
	•	472	1	"88
vertuculosus, Nees		477	1 1	" 88
	•	419	12-manus D1	" 90
		474	2	" 90
		477	Matural Olanka	" 88
		431	malancameia Rauth	" ×O
viscosus, T. Anders			tana ata muni	" QR
Walkeri, Nees iv			1	97
Wallichii, Nees		439		" e7
warreeusis, Dalz		438	Non-marrian Line	″ ພຸດ
Wightianus, Nees				"
Zenkerianus, T. Anders		439		" ແກ
zeylanious, T. Anders	400	45l		" 00
sp., Hk. f. & T. iv. 427,	428,	554 ,	pubescens, Clarke	" 97
446, 451, 466, 467	, 100	, 109	Rheedei, Clarke	,, 07

• •					
Strychnos	Vol.	Page	Styrax •	6 701	Page
rufa, Clarke		- 89			589
septemnervis, Clarke		88	1 11 01 1		589
Made Late D A.	"	90	japonicum, Sieb. & Zuco	••	589
W-11:-1:- 75 43		90-	1 / D1		743
		86 4	javanicum, Bl	11.	
Stammin hits boundate Dubb 6	, ,,,		odoratissimum, Champ	111.	588
Sturmia bituberculata, Rehb.f		696	polyspermum. Clarke	"	590
nervosa, Kchb. f		182	Porterianum, Wal'	,,	588
STYLIDIEÆ		419	rugosum, Kurz	"	589
Stylidium, Sw	iii.	420	serrulatum, Roxb	"	588
Brunonis, Griff	,,	420	subcrifolium, Hk & Arn.	"	589
Kunthii, Wall	,,	420	virgatum, Wall	,,	589
roseum, Kurz	,,	420	sp., Gamble	,,	559
sinicum, Hance	,,	420	Sueda, Forsk	٧.	13
tenellum, Sw	,,	420	corniculata, Hk. f	,,	14
uliginosum, Sw	,,	420	fruticosa, Forsk	"	13
uliginosum, Kurz	,,	420	indica, Moq	,,	14
Stylidium, Lour	'n.	743	indica, Willd	"	13
·chinense, Lour		743	hannadalara Damand		14
Stylocoryne attenuata, Voigt	iii.	104	1	"	15
		108	l managina Managin	"	13
Li minan Onio	,,	111		"	14
La millana Cablaaba	"		nudiflora, Moq	"	
breviflora, Schlecht	"	106	nudiffora, Moq	"	14
costata, Mig	"	103	nudiflora, Thw	"	13
den iftora, Wall	,,	112	sedifolia, Pall	"	10
dimorphophylla, Teysin. &			vermiculata, Forsk	"	13
Binn	,,	112	SUÆDEÆ	٧.	2
elliptica, Thw	٠,	107	Suffrenia capensis, Harv	ii.	568
fragrans, Bl	٠,	103	Sumbavia, Baill	v.	408
fragrans, DC	,,	103	macrophylls, Muell	,,	408
laviflora, Bl	,,	103	Sunipia, Lindl	v.	772
lucida, Miq	,,	103	bicolor, Lindl	,,	770
macrophylla, Wall	,,	35	scariosa, Lindl	",	772
malabarica, DC		111	Suptula, Jones	iii.	59 L
monosperma, W. & A	".	103	Suregada angustifolia, Baill.	v.	459
D 11: DA	"	111	bilocularis, Koxb		460
	"	102	2 '2 1 ' 337 11	**	459
penangensis, Miq	"	102		"	460
rigida, Wight	"		dicocca, Roxb	"	459
truncata, Wall	"	94	glabra, Roxb	"	
Webera, A. Rich	"	102	glomerulata, Baill	"	460
Webera, Kurz	_"_	105	multiflora, Baill	"	459
Webera, Wall. iii. 102, 104	, 105	, 106	Suriana, Linn	•	522
sp., Wall iii			marituma, Linn	**	522
Stylodiscus trifoliatus, Benu.	v.	345	Surwala robusta, Roem	3.	565
Styloglossum nervosum, Kuhl			Sussuela esculenta, Rumpa	١V.	61
& Hassk	٣.	854	Susum, Bl	vi.	391
Stylophorum, Nutt	1.	119	anthelminticum, Bl	,,	391
lactucoides, Benth. & IIk. f.	,,	119	anthelminticum, Maury	,,	891
Stylosanthes, Sw	űi.	148	malayanum, Planch	,,	391
facie oxalidea, Wall	,,	174	Sutera, Roth	1v.	258
777 177 7	"	148	dissecta, Walp	,,	258
Styphelia malayica, Spreng.	iii.	477	glaudulosa, Roth		258
	iii.	572		"	265
STYRACER		588	ا ما	"	121
Styrax, Linn	iii.				126
Benzoin, Dryand	"	589	affinis, Clarke	"	125
? crotonoides, Clarke	"	589	alata, Royle	"	
Finlaysonianum, Wall	"	588	alternifolia, Royle	"	128
floribundum, Griff	"	588	angustifolia, Ham	,,	125

804	GREENAN	. / /
Swertif '	Vol. Page	Sycomorus Vol. Page
	iv. 127	gummiflua, Miq v. 535
bimaculata, Hk. i. & T. iv	123 734	Syconaia Oliv ii. 427
	iv. 120	Griffithiana, Oliv ,, 427
carinthiaca, Wulf centrostemma, Wall	190	Sykesia Koenigii, Arn iv. 91
Ohler to Them	″ 194 k	thyrsiflora, Arn ,, 91
• • • • • •	" 190	Walkeri, Arn , 92
A . A	" 199	Syllepis polystachya, Fourn vii. 107
	″ 19A	Sylvæa (vide Silvæa) v. 397
corniculata, Linn corymbosa, Wight	7 198	Symphorems, Roxb iv. 599
	" 190	involucratam, Roxb , 599
decussata, Nimmo	" 197	involucratum, Kew Distrib. ,, 599
dilatata, Clarke	″ 199	involucratum, Kurz " 600
elegans, Wall	,, 125	involucratum, Wall., lapsu C., 599
elegans, Wall florida, Wall	195	Jackianum, Kurz ,, 602
Griffithii, Clarke	,, 123	microstylis, Bedd ,, 6:0
Hookeri, Clarke	197	pentandrum, Kurz ,, 602
Hugelii, Griseb	,, 129	polyandrum, Wight , 599
Kingii, Hk. f	,, 734	unguiculatum, Kurz ,, 601
lahulensis, A. Kerner	,, 128	STABLORNAR iv. 561
lurida, Royle	194	Symphoriæ, sp., Griff iii. 14
macrosperma, Clarke	. 100	Symphyandra stylosa, Royl · iii. 438
multicaulis, D. Don		Symphyllia mallotiformis,
nervosa, Wall	1.00	Muell v. 418
paniculata, Wall	" 100	silhetiana, Baill ,, 418
peloria, Griff	. 190	Sumphyoglossum hartatum,
perennis, Linn	190	Turcz 1v. 525
	. 128, 734	Symplocinea, Griff iii. 579
pulchells, Ham	105	Symplocos, Linn iii. 5/2
purpurascens, Wall	. " 121	acuminata, Bedd , 583
racemosa, Wall	194	acuta, Thw ,, 584
	197	adenophylla, Wall ,, 575
rotata, Pall	100	anamallayana, Bedd ,, 581
speciosa, Wall	190	angustata, Clarke " 585
speciosa, D. Don	. ,, 128	apicalis, Thw ,, 586
speciosa, G. Don	100	attenuata, Wall ,, 573
tetragona, Clarke		Beddomei, Clarke ,, 582
Thomsoni, Clarks	190	bractealis, Thw ,, 584
trichotoma, Wall		caudata, Wall ,, 577
zeylanice, Walker	. " 127	celastrifulia, Griff ,, 5/5
SWERTIEÆ		cerasifolia, Wall ,, 580
Swielenia Ch ckrassia, Roxl		cordifolia, Thw ,, 586
Chloroxylon, Roxb		corona'a, Thw ,, 501
febrifuga, Roxb		orassipes, Clarke ,, 580
rubra, Wull		01414601400, 114444
Soymida, Dunc		1 Outloada, 210wi iii iii iii iii ji
Sotrophola, Ham		, accord, 224200
trilocularis, Roxb		
velutina, Wall		Clogatio, 27001 III III III III III III III III III
villosa, Wall	2 241	feedons, Thw ,, 500
SWIETENIER	00	100000000000000000000000000000000000000
Swintonia, Griff	90	Total Bindon, account the title to
Griffithii, Kurs	. 00	/ / / / / / / / / / / / / / / / / / /
Helferi, Hk. f	. " 26 26	J.07.00 a7.000, 17.0111
Schwenkii, Teysm. & Bing	97	689
spicifers, Hk. f	" 27 v. 528	577
		578
Sycomorus capensis, Miq	. 7. 585	grandinora, watt " " " " "

•			
Symplocos	Vol.	Page	Symplocos Vol. Page
Hamiltoniana, Wall	iii.	576	racemosa, Wall. iii. 573, 575, 576,
hebantha, Thw	"	586	579
Henscheli, Benth	"	588	racemosa, Wight ili. 583
hirsuta, Thw		586	ramosissima, Wall, 577
hirsuta, Wight & Gardn.	"	585 •	malianilata Clash E00
hiomidala The		585	
Hohenackeri, Clarke	"	582	
77	578.		
			roses, Bedd iii. 583
Horsfieldiana, Miq	iii.	574	rubiginosa, Wall " 580
iteophylla Miq	"	575	rufescens, Thw ,, 584
javanica, Kurz	"	574	salicifolia, Ham ,, 579
jucunda, Thw	"	585	sessilis, Clarke ,, 587
kurgensis, Clarke	"	576	spicata, Roxb ,, 573
lachnobotrya, Miq	"	574	spicata, A. DC ,, 573
læta, Thw	. ,,	584	spicatæ affinis, Bedd " 576
lancifolia, Sieb. & Zucc.	.))	577	Stawellis, F. Muell ,, 573
latiffora, Clarke	• "	585	subsandata Wight EQE
laurina, Wall		573	mileste Viine " FRO
lainata ahaa Waas	"	580	S
I Am . L	"	580	C
	"	577	Contract of the same of the sa
leptostachya. Sieb. & Zuoc.	"		Swinhoeana, Hance ,, 577
leucantha, Kurz	F 770	579	therefolia, Ham ,, 575
	573,		theæfolia, D. Don ,, 576
Loha, Mig	111.	573	uniflora, Bedd ,, 581
lucida, Wall	"	575	Verhuelli, Jungh. & De Vr. ,, 574
macrocarpa, Wight	,,	582	yersicolor, Clarke ,, 584
macrophylla, Wall	,,	578	xanthophylla,Jungh & DeVr ,, 574
Maingayi, Benth	,,	588	sp., Gamble 575
marginalis, Thw	"	587	sp., Griff. iii. 575, 576. 577, 578, 579
microcarpa, Benth	"	577	sp , Hk. f. & T. iii. 575, 576, 577,
microphylla. Wight		581	578, 579, 582
	"	586	Synanthera, Wall. iii. 231, 235, 248,
	"	574	288, 243, 375
	"	591	
monantha, Wight	"		Synantherias, Schott vi. 517
nervosa, A. DC	"	576	sylvatica, Schott , 518
nervosa, Wight	,,	582	Synaptea grandi lora, Kura i. 801
nicobarica, Clarke	,,	580	odorata, Griff ,, 301
ohtusa, Wall	,,	583	Syndesmis coarctatus, Griff. ii. 22
oligandra, Bedd	"	574	elegans, Wall " 22
ophirensis, Clarke	"	579	tavoyana, Wall ,, 22
oxyphylla, Wall	"	574	Syndiclis, Hk. f v. 127
paniculata, Wall		573	paradoxa, Hk. f , 127
pauciflora, Wight		587	Synedrella, Gartn iii. 303
	"	574	andiffure Conta 908
		587	
pendula, Wight	••	587	
pendula, Thw			
phyllocalyx, Clarke	"	575	Synæcia diversifolia, Miq v. 529
polycarpa, Wall	"	573	falcata, Miq ,, 518
polystachya, Wall	,,	5 75	serpens, Miq ,, 518
polystachya, Zoll. & Mor.	"	574	sumatrana, Miq ,, 518
propinqua, Hance	"	576	Synphillium torinioid s,
prunifolia, Sieb. & Zicc.	"	577	Griff iv. 275
pulchra, Wight		583	Syntherisma ciliare, Schrad. vii. 14
pyrifolia, Wall	••	579	glabrum, Schrad ,, 17
		576	audaana Sahrad 14
	"	576	C
racemosa, A. DC iii.	578		
racemosa, Roxb iii.	U/U,	3,0	Emodi, Wall ,, 605

~ .			_			
Syringa, (Page	Syzygium	Vol	. Page
persica, Linn	•••	iii.		oliganthum, Thw	. ii.	494
Syringræ	•••	iii.	590		,,	476
Syzyganthus multifloru	8,	_		Panealla, Wall	,,	.498
Steud		₹i,	677	politum, Wall	,,	485
Syzygium alternans, Miq.		ii.	500	polyanthum, Thw		498
allissimum, Wall,		,,	493	pulchellum, Wall		492
angkolanum, Miq		,,	498	punctulatum, Wall	. ,,	487
areolatum, DC	•••	"	490	pyrifolium, DC		487
assimile, Thw	•••	"	493	707-11	•••	497
avene, Miq			489	l • • • • • • • • • • • • • • • • • • •	"	492
Calsameum, Wall		"	490		,,	496
70 11 1 70 71	**	"	485	-2-23 107-11	. ,	487
	•••	"	496	1 1.01		494
orachiatum, Miq calophyllifolium, Thw.	•••	"	494			495
/21 137 11	•••	"	478	rubicundum, W. & A		
capillare, Wall	•••	"	490	salicifolium, Wall		495
caryophyllæum, Gærtn		"	499	sclerophyllum, Thw.	. "	494
caryophyllifolium, DC.	•••	,,	482	scoparium, Wall	,	489
caudatum, Wall	•••	"		spathulatum, Thw	,,	495
cine, eum, Wall	• • •	"	496	speciosum, Wall	. ,,	481
claviflorum, Wall	•••	"	484	suavissimum, Wall	. ,,	484
concinnum, Wall	•••	"	482	subdecussatum, Wall	. ,,	491
contractum, Wall		"	485	sylvestre, Thw	. ,,	493
cordifolium, Thw corticatum, Wall	•••	,,	491	tenue, Wall	. ,,	5 70
corticatum, Wall		,,	485	tetragonum, Kurz		497
costatum, Miq	•••	"	498	vastum, Wall		498
cuneatum, Wall		,,	495	venosum, DC		490
cyclophyllum, Thw		"	494	venulosum, Wall		490
cymosum, DC	•••	"	482	verecundum, Wall		496
densiflorum Wall		,,	484	vimineum, Wall		482
excavatum, Wall	•••	"	484	Wightianum, Wall		485
expansum, Wall		"	491	zeylanicum, DC		485
excavatum, Wall expansum, Wall ficijolium, Wall		•••	497	O:00	•	484
filiforme Wall		"	478	sp., Griii	. ,,	202
fi'iforme, Wall firmum, Thw	•••	"	476	Taharnamontana Lina	. iii.	645
firmum, Thw frulicosum, DC	•••	"	499	Tabernamontana, Linn		648
~ 1 · m	•••	"	489	alternifolia, Linu	•	648
	•••	"	476	alternifolia, Roxb		
grande, Walp	•••	"	486	calycina, Wall		649
gratum, Wall	•••	"	500	Colignonæ, Van Heurol		CAT
H yneanum, Wall	•••	"		& Muell	• ,,	647
inophyllum, DC	•••	,,	481	coronaria, Br	٠,,	646
Jambolanum, OC	•••	"	499	corymbosa, Roxb	• ,,	646
kalahiense, Korth	•••	,,	489	crispa, Roxb	. ,,	618
lateriflorum, Royle	•••	"	499	cylindracea, Wall	. ,,	632
lineare, Wall	•••	,,	486	densiflora, Wall	. ,,	633
lissophyllum, Thw longiflorum, Wall		,,	488	dichotoma, Roxb	. ,,	645
longiflorum, Wall		,,	484	dichotoma, Gibs	. ,,	646
Michelii, Lam	•••	,,	505	divaricata, Bl	. ,,	647
micranthum, Thw	• • • •	,,	483	elastica, Spreng		657
montanum, Thw		,,	476	Finlaysoniana. Wall.,		649
myrtifolium, DC		" ·	483	graciliflora Wall	-	647
Neesianum, Arn	•••	"	493	gratissima, Lindl	••	648
nelitricarpum, T. & B.		"	482	Heyneana, Wall		646
nervosum, DC		"	498	hirta, Hk , f		646
nodosum, Miq	•••	••	498	indica, Willd		649
		"	492	intercedens, Van Heurck		J.0
. L	•••	"	498	4 34 11		646
. 7	•••	"	498	. 371		646
occiusum, Miq	•••	"	700 ,	javanica, Miq	"	010

Tabernæmöntana	Vol.	Page	1	•	Vol	. Page
macrocarpa, Jack	iii.	. 649	Talauma, Juss	•••	`i.	40
malaccensis, Ilk. f	,,	649	Hodgsoni, Hk. f.	S T.	,,	40
membranifolia, Kurz		649	lanigera, Hk. f. S	T	,,	40
microcarpa, Wall		633	mutabilis, Bl			40
monocarpa, Steud		619	Rabaniana, Hk. f.	8. T	• • •	40
		649	Taliera bengalensis,		.,	429
	. 633		101 11 34	•	_	429
	• . •				. ,,	
parvifolia, Roxb			Talinum, Adans		1.	247
peduncularis, Wall	. ,,	647	cuneifolium, Well		,,	247
persicariæfolia, Willd	. ,.	649	decumtens, Willd.	•	ii.	661
polyantha, Bl	. ,,	671	_ indicum, W. & A.	•••	i.	247
recurva, Roxb	. ,,	648	Tamarindus, Linn.		ii.	273
rccurva, Hohen	. ,,	646	indica, Linn		,,	273
rostrate, Wall		618	occidentalis, Gaeri	in	,,	273
salicifolia, Wall		637	officinalis, Hook.		,,	273
sphærocarpa, Bl		646	TAMARISCINEA		i.	248
subcapitata, Wall	• • •	647	Tamarix, Linn		i.	248
· ? subcapitata, Hk. f. & T.	•••	633	articulata, Vahl			249
montivillata Dodd		634	articulata, Wall.		j. 248	
TIV-11/-1 / O4 1	• • • • • • • • • • • • • • • • • • • •	649	dioica, Roxb		•	249
Tacas F	- "	287				249
Tacca, Forst			ericoider, Rottl.		,,	
aspera, Roxb		288	epacroides, Sm.		,,	248
cristata, Jack	. ,,	287	gallica, Linn		,,	218
integrifolia, Ham	. ,,	288	gallica, Wight	• • •	,,	248
integrifolia, her	. ,,	287	germanica, Linn.	• • •	,,	250
lævis, Roxb	. ,,	288	indica, Koon		,,	248
pinnatifida, Forst vi	. 287,	517	indica, Willd		,,	248
pinnatifolia, Gærtn	. vi.	287	mucronata, Sm.		. ,,	249
Rofflesiana, Jack		287	orientalis, Forsk.	•••	,,	249
TACCACEÆ		286	Pallasii, Desv		. ,,	248
Tæganocharis, vide Tenago			passerinoides, Del.		,,	249
-1		562	Pharas, Ham		• • • • • • • • • • • • • • • • • • • •	2 19
en 1 1 1 1 1 1	••	54	ramosissima, Lede	L.		248
		55				248
Griffithii, Hk. f	,	76	saliua, Dyer stricta, Boiss		,,	249
Tæniophyllum, Bl	. 11.	1			,,	249
Alwisii, Lindl		76	tenacissima, Ham.		. ,,	
Jerdonianum, Wight	,	60	usneoides, E. Mey.		. ,"	249
scaberulum, $Hk. f.$,,	77	Tanacetum, Linn.		ni.	318
serrula, $Hk.f.$, ,,	77	artemisicides, Sch	ultz	. ,,	318
Tainia, Bl	v.	819	Falconeri, Ilk. f.	_ · · · ·	. ,,	320
angustifolia, Benth	• ••	819	fruticulosum, Lede	eb	,,	318
barbata, Lindl		803	fruticulosum, Clark	: ө	,,	318
bicornis, Benth		820	gossypinum, Hk. f	. d T	. ,,	321
	vi.	193	gracile, Hk. f. & T	" .	,,	318
hastata, Hk. f v. 82			longifolium, Wall.		,,	320
	٧.		nanum, Clarke		,,	320
khasiana, Hk. f. v. 82	1 01		nubigenum, Wall.		,,	318
			purpureum, D. Do			246
latifolia, Benth. v. 820, v			pyrethroides, Schu	•	,,	315
latilingua, Hk. f. v. 82					,,	320
maculata, Hk. f v.	. ozi,	100	robustum, Hk. f. 8		. ,,	
	190,				. ,,	319
Maingayi, Hk . f . v. 82			tennifolium, Jacque		,,	319
minor, Hk. f v. 82	l, vi.	193	tibeticum, Hk. f. &	γ T	. ,,	319
penangiana, Hk. f. v. 820	0, vi.	192	tomentosum, DC.	•••	. ,,	319
promensis, Hk. f	v.	820	viscosum, Wall.		. ,,	246
peciosa, Bl		822	Tanghinia dichotoma	, G. Do	n iii.	645
viridi-fusos, Benth		820	lactaria, G. Don		,,	638
			•			

Tanghir ia '	Vol.	Page	Vol. Page	•
laurifolia, G. Don	iii.	638	Telogyne indica, Baill v. 398	į
Odollam, G. Don	**	638	Tenagocharis (lapsu Tæga-	
Taphrospermum altaicum,	-		nocharis) cor lofana, .	
С. А. Меу	i,	145	Hochst vi. 562	3
Tapinocarpus Dalzellii, Schot	vi.	513	Tephrosis, Pers ii. 110)
T 11 - TO 1-		513	119 119 119 119 119 119 119 119 119 119	
700 · · · ·	ii.	28	114	
		28	amounted Dama 119	
hirsuta, Hk. f	iii.	401	augustan Winha 114	
Taraxacum, Hall			- 1- 1 7 7 7	
eriopodum, DC	"	401	calophylla, Bedd ,, 111	
officinale, Wigg	"	401	candida, DC ,, 111	-
Wallichii, DC	"	401	coccinea, Wall ,, 112	
Wattii, Hk. f	"	402	Colutea, Wight ,, 113	
Tarrietia, Bl	i.	862	diffusa, W. & A ,, 113	
simplicifolia, Mast	"	362	Ehrenbergiana, Schweinf. " 114	-
Tanscheria, Fisch	i.	163	elegans, Wall ,, 112	ì
desertorum, Ledeb	,,	164	fusca, W. & A o,, 114	
lasiocarpa, DC	"	164	galegoides, Grah " 112	
Taverniera, DC	2:	140	Grahami, Wall " 112	•
cuneifolia, Arn		140	Haymagna Wall "111	_
ephedroides, Jaub. & Sp.	"	140	Wookowiene W 64 119	
	"	140	hamanaumus DO " 111	
gonoclada, Jaub. & Sp	"	140		
Nummularia, DC	"		, , , , , , , , , , , , , , , , , , , ,	
spartea, DC	>>	140	incana, Grah ,, 118	
Tavaceæ, Griff	٧.	654	indiyofera, Bertol ,, 113	
TAXEÆ	₹.	644	intermedia, Grah ,, 112	
TAXODIEÆ	₹.	644	lanceæfolia, Link ,, 113	
Taxotrophis, Bl	٧.	488	lanceolata, Grah ,, 113	l
Roxburghii, Bl	,,	488	leptostachya, DC ,, 112	}
zevlanica, Thw	"	488	lobata, Grah ,, 112	ì
Taxus, Tour	v.	648	maxima, Pers " 113	
baccata, Linn		648	W:4-1-11:: Ch 119	
	"	648	manusara Porm 111	
A = 1 X27-11	"	655	manuifana Wimhe 119	
	"	648	namaidana Guah 114	
nepalensis, Jacq	"	648	mantashailla Cook "119	
nucifera, Wall.	"	-	,	
orienta is, Bertol	"	648	Petersiana, Klotz ,, 110	
virgata, Wall	"	648	pulcherrima, Wight ,, 112	
Wallichiana, Zucc	."	648	pulchra, Coleb ,, 105	
Tecoma, Juss	iv.	378	pumila, Pers ,, 113	
? glauca, DC	"	378	purpurea, Pers ,, 112	
suaveolens, G. Don	"	383	racemosa, W. & A ,, 105	
undulata, G. Don	"	378	senticosa, Pers ,, 112	ì
wylocarpa, G. Don	"	384	sericea. DC ,, 110	•
Tecomella undulata, Seem	iv.	378	spinosa. Pers ,, 112	1
Tectona, Linn, f	iv.	570	stricta, Grah ,, 112	1
grandis, Linn. f		570	nuhaman DC "110	
** 11, 1 THE TE	"	571	Tradonii Grah	
Hamiltoniana, Wall	vii.		tonnia Wall 111	
Teinostachyum, Munro	•		tinatoria Dara 111	
attenuatum, Munro	"	410	tin stonia Chah	
Dulloon, Gamble	"	411	tinctoria, Grah ,, 112	
Griffithii, Munro	"	410	timoriensis, DC ,, 113	
Helferi, Gamble	,,	411	villosa, Pers ,, 113	
? maculatum, Trim	"	419	Wallichii, Grah ,, 112	
schizostachyoides, Kurz	"	393	Teramnus, Sw ii. 184	
Wightii, Bedd	"	410	flexilis, Benth ,, 185	,
Telmatophace gibba, Scileid.	νí.	557	labialis, Spreng ,, 184	

•								
Teramnus		Vol.	Pare	Terminalia			Vol.	Page
mollis, Benth		ii.		tomentosa, W.	Æ A ¨	• •••	ii.	447
Terebinthacea, Wall.	ii. 11.	24 36	37.40	trarancorensis,				449
		ii.		trioptera, Hey			"	448
a'ata, Roth			447				"	446
angustifolia, Roxb.		,,		zeylanica, Heu			•	
angustifolia, Noxo.	•••	,,	419	sp., Korz	•••	•••	"	444
angustifolia, Jacq.	•••	,,	414	Terniola, Tul.		::	v.	62
angusti olia, Rump'	•		. 327	ceylanica, W	ight	(vide		
Arjuna. W. & A.		ii.			•••	• • • • •	,,	62
Aruta Ham	••• ,	,,	.416	foliosa. $Wedd$.		• • • •	"	63
attenuata, Edgew	. (s	40		Lawii, Wedd.			"	63
Errata).				longipes, Tul.			"	6 3
Badamia, Tulasne	•••	,,	414	pedunculosa,	Wedd.		,,	63
belerica, Roxb. (s-c	Erra	tu) "	445	pulchella, Tul.			"	63
belerica, Bedd.		,,	445	ramosissima,	Weda.		"	63
belerica, W. & A.		,,	445	zeylanica, Tul			,,	62
bengalensis, $Roxb$.		,,	449	Ternstræmia, Li	nn		i.	280
Renzoin, Linn		• ,,	444	arcura, Mig.			,,	281
· Berryi, W. & A.		,,	447	bilocularis, Ro			"	287
bialata, Kurz		••• ,,	449	? coriacea, Wa			"	282
Catappa, Linn.		••• ,,	4.11	crenulata, Wal		• • • • • • • • • • • • • • • • • • • •	"	283
Catappa, Tulasne		,,	444	crenulata, Wig	ht		"	283
Chebula, Retz		ii. 416		cuncifolia, Poo				231
citrina, Roxb		ii.	446	? dumosa, Wall			"	282
coriacea, W. & A.			448	emarginata, C			"	281
crenulata, Kurz .		,,	448	? integerrima,			282,	
		,,	448	japonica, Thur			i.	280
crenulata, Roth		,,	445					281
ejlandulosa, Roxb.		,,	7.12	P khasyana, Cl			,,	284
foetidissima, Griff.		,,	445	Lushia, Ham.			"	
gangetica, Roxb.		••• ,,	416	macrocarpa, S			"	281
Gella, Daiz	•••	,,	445	? macrophylla,		•••	"	230
glabra, Thw	•••	,,	448	penangiana, C			"	281
glabra, W. & A.		,,	447	pentapetala, Je			"	287
intermedia, Spreng.		,,	444	racemosa, D. D		• • • •	"	286
javanica, Miq		,,	418	? reticulata, W			"	282
lancifolia, Griff.		,.	454	? sericea, Wall.		•••	,,	283
microcarpa, Done.		,,	445	serr ta, Roxb.		• • •	,,	287
moluccana, Lamk.		,,	444	trilocularis, Ro	xb	• • •	,,	287
moluccana, Miq.		,,	445	Wightii, Chois			"	281
moluccana, Roxb.		,,	445	TERNSTRUM LACE.	Æ		i.	279
moluccana, Wall.		,,	449	TERNSTREMIEÆ			i.	279
moluccana, Willd.		,,	445	Terpnophyllum	zeylani	cum,		
monaptera, Roth		,,,	448	Thw			i.	2 68
myrioc rps, Hew		<i>"</i> "		Tet e viridiflora, 1			vi.	265
*** · · ·		•	448	Tetracera, Linn.			i.	31
Musil Myrobalana, Roth		.,	414	Assa, DC			,,	31
nitens, Presl		• • • • • • • • • • • • • • • • • • • •	445	Euryandra, Vo	ıhl		"	32
		,,	447	lævis, Vahl			"	31
ovalifolia, Rottl.		,,	447	lucida, Wall.				32
ovata, Herb. Rottl.		,, 410 ',;		macrophylla,			"	32
paniculata, Roth		419, ji			•••		"	31
parviflora, Thw.		11.	446	sarmentosa, Wi			"	31
procers, Kozb		,,	444				"	31
punctata, Roth	•••	,,	415		•••		"	31
pyrifolia, Kurz	•••	,,	448	trigyra, Roxb.			"	O.L
reticulata, Roth	•••	,,	446	Tetracrypta cin			::	440
subcordata, Willd.		,,	441	Gardn. & C		-1	ii.	442
tomentella, Kurz	•••	,,	446	Tetractinostigma				940
tomentosa, $Bedd$.	•••	,,	447	Hassk.'	••• ••	• •••	₹.	346

					/		
a (VOI.	Page	Tetranthera			Vol.	Page
Tetractis, vide Tetractis	. iii.	304	diversifolia, Bl			٧.	172
Tetractomia, Hk. f	. i.	490	? Doshja, D. Don		•••	,,	168
Beccarii, Hh. f., lapsu H.	,,,	491	elliptica, Nees	•••		"	.171
majus, Hk . f	•••	491	elongatu, Wall	•••		"	165
Roxburghii, Hk. f		491					122
(III A		178	1		••	"	162
andania Nasa			A 11 THE 11	•••	••.) :	178
ceylanica, Nees	,,,	178	foliusa, Wall	•••	•••	"	
consimilis, Nees	• ,,	179	frulicosa, Ham	•••	•••	"	163
foliosa, Nees	• ,,	178	fruticosa, Nees	•••	•••	"	163
furfuracea, Nees	,,	178	fulva, Bl	•••	• • •	,,	1.0
Canuginosa, Nees	,,,	178	jurfuracea, Wall.	•••		,,	178
obovata, Nees		153	Gardneri, Thw.			11	176
umbrosa, Nees		179	gemelliflora, Miq.			"	163
Tetradium trichotomum, Loui		450	geninata, Nees		•••		158
Telragastris ossea, Gærtn		423	glaberrima, Thw.			"	173
// Dadaman - 1 10 D = -	• •	657	glabraria, Nees			"	158
				•••	•••	"	
Grahamiana, Wight	• ,,	657	P glabrata, Wall.	•••	• • •	0.9	174
nudiflora, R. Br	,,,	657	glauca, Wall	•••	•••	"	167
_ rufinervis, Miq	, ,,	657	glaucescens, Wall.	•••	•••	"	135
Tetramerista, Miq	. 1.	526	grand flora, Wall.	•••	•••	"	181
glabra, <i>Miq</i>	, ,,	526	grandis, Meisso.	•••		,,	162
Tetramorphæa Belangeriana,			grandis, Wall		•••	,,	162
DC		385	Griffithii, Meissn.	• • •		"	183
Bruguiseriana, DC		385	hexantha, Sieb		•••		163
7.4. 1 1.1 11		147	Hookeriana, Meisan			"	116
		147			•••	"	174
Wallichii, Miq	"		iteodaphne, Nees	•••	•••	"	
Zollingeri, Miq		147	iteodophne, Thw.	•••	••	"	173
Tetrunthera accedens, Bl.	. ▼.	172	japonica, Wight	•••	•••	"	157
albicans, Kurz	,,	171	khusiana, Meissn.	•••	•••	"	164
alnoides, Miq	. ,,	163	læta, Nees	•••		"	169
amara, Noos	. ,,	163	læta,? Wall	•••		,,	170
angusta, Wall	, ,,	163	lanceæfolia, Grah.			11	176
angustifolia, Gamble		168	lanceæfolia, Rozb.		v.	167,	176
	152	169	lancifolia, Roxb.	•••		v.	159
apetala, Dalz. & Gibs		157	lanuginos1, Wall		•••	,,	178
apetala, Roxb		158	laurifolia, Bl				158
~ . 1 117 11		153	laurifolia, Ham.			."	163
apetata, Wall	`,,	167		•••	•••	"	158
attenuati, Nees			laurifolia, P Jacq.	•••	•••	"	
attenuata, Wall ▼.		167	luurifolia, Nees	•••	•••	. "	158
Baula, Ham	. ▼.	174	laurifolia, Roxh.	•••	v.	158,	
bifaria, Wall	"	184	? laurifolia, Wall.		•••	₹.	158
caduca, Ham	,,,	152	ligustrina, Noos			"	158
calophylla, Kurz	,,,	165	ligustrina, Thw.			"	158
camphoracea, Wall	, ,,	135	litoralis, Bl			,,	153
capitata, Roxb		158	longifolia, Nees			,,	167
capitulata, Miq		163	lucida, Bl			,,	172
caudata, Wall		185	macrophylla, Wall.				163
celastroides, Miq	"	159	martabanica, Kurz			"	164
		181			•••	"	166
chartacea, Meissn			micrantha; Meissn.		•••	"	162
chartacea, ? Wall v.		, 170	monopetala, Roxb.	•••	•••	"	
chrysantha, Bl	▼.	159	multiflora, Bl		•••	"	158
citrata, Nees	,,,	155	multiflora, Zoll.	···	•••	"	162
citrifolia, Spreng	"	158	myristicæfilia, Wal	i.	•••	"	172
cordata, Jack	,,,	177	Necsiana, Wall.	•••	•••	,,	186
cordifolia, Meissn		177	nemoralis, Thw.	•••		"	167
coriacea, Heyne		166	nervosa, Meissn.	•••		"	173
Cuipala, D. Don		178	nigricans, Moisso.	•••	•••	"	171
	"		,,			**	

•							
Tetranthera •	Vol.	Page	Tetrapogon	•		Vaci	Page
nítida, Roxb	_	174	villosus, Desf			vii.	
nuculanea, Kurz		166	Toucrium, Linn			iv.	700
ohlonga, Nees		168	elevatum, Benth.	•••			700
obounds Wall		153	Fortunei, Benth.			"	701
2 aubumaanu - 16:-		180		•••	•••	"	703
aliandan Malaan	. ,,		hispidum, Wall.	•••	•••	"	
oleoides, Moissn		175	laxum, D. Bon	- 11	• • •	"	701
oxyphylla. Wall	. ,,	183	macrostachyum, W		•••	"	699
pallens, D. Don	. ,,	179	palmatum, Benth.		•••	17	702
Panamarja, Nees	. ,,	175	paniculatum, Hb. I		• • • • •	"	700
Panamanja, Ham	. ,,	175	quadrifarium, Ha		•••	. 17	701
Perrottetii, Bl	- 11	177	quadrifarium, Hb.		ght	,,	701
platyphylla, Nees	. ,,	158	Royleanum, Wall.			,,	700
polyantha, Wall	. ,,	155	Scordium, Linn.	•••		"	702
polycephala, Wall	. ,,	158	secundum, Heyne			"	672
prunifolia, Wall	. ,,	186	stoloniforum, Rox			,,	70Q
	. 178	, 179	tomentosum, Heyn			"	700
pusille, Bl		159	tomentosum, Wight			"	701
'? racemoso-umbellata, Bl		158	viscidum, Bl				700
rangoonensis, Meissn	• •	161	Wallichianum, Boi			"	673
**	• • • • • • • • • • • • • • • • • • • •	183	Wightii, Hk. f			"	701
0 1 1 1 10		158			•••	"	701
	•	180	sp., Benth Teysmannia, Rchb. f.	•••	•••	"	483
Roxburghii, Hassk			in the force of the f	6. 7		VI.	
Roxburghii, Nees		158	altifrons, Rchb. f.	y Z		. ??	483
salicifolia, Hk. f. & T.		168	Teysmannia, Miq.		•••	iii.	652
salicifolia, Roxb	. ,,	167	Hookeriana, Miq.	• • •	•••	"	652
salicifolia, Wall	. ,,	168	laxifolia, Miq.		•••	19	652
saligna, Hk. f. & f	. ,,	168	Thaltassia ciliata, Kw		• • •	¥1.	570
saligna, Nees		169	Hemprichii, Asch.	• • •	• • •	"	570
? semecarpifolia, Wail. v	. 163	, 165	stipulacea, Koon.			v.	664
scricea, Moissu	v.	156	? stipulacea, Miq.			,,	663
sericea, Wall	. ,,	156	THALASSIER			v.	659
sessitifora, Meissn		172	Thalia cannæformis, V	Villd		١i.	258
	. 1. 6.	165	Thalictrum, Linn.			i.	10
ter-a, Spreng	. v.	158	acaule, Camb			,,	12
Thomsonii, Meissp		170	alpinum, Linn.			"	12
tomentosa, Nees		158	bractcatum, Roxb.			"	2
tomentosa, Roxb		157	Chelidonii, DC.			"	11
tuberculata, Miq. (Lepida-		20.	Chelidonii, Hk. f. &			"	11
		172	cultratum, Wall.				11
denia) umbrosa, Nees	.,	179	eysticar pum, Wall.			,,	îĩ
		179	Dalzelli, Hook			"	13
umbro-a, Wall	. 113		elegans, Wall			"	10
			fætidum, Linn		•••	7.7	14
verticillata, Hum		163	foliolosum, DC.	•••	• • •	"	14
Walkeri, Meiesn	,,	174			• • •	"	14
Wightiana, Bedd	, ,,	177	glyphocarpum, W. &	ŁA.	•••	,,	
Wightiana, Hk. f. & T	,,,	164	javanicum, Bl		•••	"	13
sp., Griff	,,	184	kemense, Fries		• • •	,,	14
sp., Griff sp., Hk. f. & T		156	macro tigma, Edgev		•••	,,	11
Tetraotis paludoso, Bl., lapsu			majus, Jacq marginatum, Royle	•••	• • •	,,	11
Tetractis	, iii.	304	marginatum, Royle			"	12
Tetrapeltis fragrans, Wall	. v.	844	Maxwellii, Royle			,,	14
Tetraphyllum, Griff		363	microphyllum, Royl	0		,,	12
bengalense, Clarke		363	minus, Linn			"	14
sp., Griff	,,	363	minus, Boiss			.,	14
Tetrapilis brachialus, Lour.	:::	612	neurocarpum, Royle				11
Tetrapogon tetrastachys, llack	wii		pauciflorum, Royle		···	"	īī
		291	peduncalatum, Ed				12
triangularis, Hochst	"	20 I	Posturous mounts, 170;	,	•••	;,	-

mb-lintf	•
Thalictium Vol. Page	Vo'. Page
platycarpum, Hk. f. & T. i. 11	Theriophonum, $Bl.$ vi. 512
punduanum, Wall ,, 13	cronatum, Bl ,, 512
radiatum, Royle 13	Dalzellii, Schutt ,, 513
reniforme, Wall " 11	infaustum, N. E. Br, 513
rostellatum IIk f com " 10	Kleinii, Schott ,, 512
rotundifolium, Dt	Wightii, Schott " 512
rutæfolium, IIk. f. & T 12	
	zerlanjano N F Re 512
secundum Kolomoni and	G11 1 Th 71
	bowhata Raula CO
virgatum, Royle ,, 14	barbata, Royle ,, 62
virgatum, Hk. f. & T ,, 12	inflata, Camb ,, 63
Thamnocalamus Falconeri,	laburnifolia, D. Don " 62
Hk. f vii 383	nepaulensis, DC , 62
spathistorus, Munro ,, 382	Theropogon, Maxim vi. 324
? Thaspium foliosum, Royle ii. 689	pallidus, Maxim vi. 270, 324
Thea assamica, Chois i. 290	THESIE v. 229
assamica, Mast. 292	Thesium, Linn v. 229
chinensis, Ling 292	alataricum, Kar. & Kir ,, 230
veridis Chois una l	himalense, Royle , 229
Theoceanic Duki t	amariti agarda III.a f fa m 900
alata Pan & Dobb f 10	multisquis Todah 990
Mujnooni Ul. f	
Maingayi, Hk. f, 20	nilagiricum, Miq ,, 230
quinquefida, Hk. f , 20	Wightianum, Wall ,, 230
Zollingeri, Rchb. f ,, 19	Thespesis, Corr i. 345
Theka, Juss i . 571	Lampas, Dalz. & Gibs ,, 345
ternifolia, Ham , 571	populnea, Corr ,, 345
Thela alba, Lour iii. 480	Thespis, DC iii. 259
_ coccinea, Lour ,. 481	divaricata, DC ,, 259
Thelasis, Bl vi. 85	erecta, DC ,, 259
bifolia, Hk. f, 86	Thibaudia acuminala, Wall. iii. 455
P capitata, Bl ,, 86	aumiculata ChiA' 144
carinata, Bl vi. 87, 88	annalifolm Criff "AFA
\ 10 11 6 1 00 1	ulakaa Criff AAA
donner Ul. f	multhanimfalin Cniff 450
	1
elata, Hk. j ,. 87	loranthiflora, Wall, 446
elegans Bl v. 811	macrantha, Hook ,, 446
elongata, Bl vi. 86	myrtifolia, Griff ,, 449
khasiana, $Hk. f.$, 87	obliqua, Griff " 443
longifolia, $Hk. f. \dots , 87$	pulcherrima, Hook ,, 446
$\mathbf{pygmeea}, Lindl. \dots \dots$	retusa, Griff ,, 451
pygmæa, Lindl , 87	revoluta, Griff ,, 453
Thelepogon, Roth vii. 148	serrata, Wall 452
elegans, Roth ,, 148	setigera, Wall ,, 443
elegans, Roth " 144	Sprengelii, Wall " 453
ranguingua Oppopus " 167	nama unta Domin 449
Themada Wanah 910	annianata Wall
unath na Haob	41 177 4 387 11
unquema Haele " 911	
arguens, Hack ,, 211	sp., Griff iii 453, 460
ciliata, Hack ,, 213	Thibaudiacea, Griff iii. 453
Cymbaria, Hack ,, 215	Thibaudies iii. 442
Forskahlii, Huck ,, 212	Thisbe, Falc vi. 129
gigantea, Hack ,, 216	Thismia, Griff v. 666
Helferi, Hack ,, 214	Brunoniana, Griff " 666
polygama, Gmel ,, 212	Brunoniana, Miers " 666
tremula, Hack ,, 214	Gardnerians, Hk. f ,, 666
triandra, Forsk ,, 212	Thladiantha, Bunge ii. 630
Тнеорнаятел ін. 507	calcarata, Clarke (see Errata).

Thladiantha			Then ham is		٠.	_
dubia, Bunge (see Errata)	Vol.	Page 631	Thunbergia	•		Page
		631	longift ra, Benth.	•••		391 392
min in the contract of the con	".	161	lutea, T. Anders. mysorensis, T. An			393
		162				393
	"	162	pendula, Hassk.	•••		
cardiocarpum, Hk. f. & T.	"	162	Roxburghia, Necs	•••		390
eachleaniforms DC	"	162	scandens, Per	•••	, ,,	390
cochleariforme, DC cochlearioides, Hk f. Y T	"	162	subsagittata, Blanc			390 391
O 10111		162	tomentosa, Wall.			390
	11	162	volubilis, Pers			
Kotschyanum, Boiss	"	130	Wightians, T. And		•	393
THLASPIDEE	1.	643	THUNBERGIEÆ	•••		388
Thomsonia Wall	v.		Thunia alba, Rehb. f	• • • • • • • • • • • • • • • • • • • •		818
Thomsonia, Wall	₹i.		Bersoniæ, Ilk. f.			818
Hookeri, Engl nepaleusis, Wall	17	518	Marshalliana, Re	hb. f.,		010
There seems a from the control of th		518	lapsu Phajus			818
Thoracostachyum, Kurz		680	pulchra, Rehb. f.		•	818
bancanum, Kurz	٠,,	680	Thuya aphylla, Linn			249
hypolytroides, Clarke	,,	680	Thylacospermum, Fe		i,	243
Thotten, Rottb	٧.	74	rupifragrum, Schre		"	243
dependens, Klotz	,,	74	Thymelmy, Endl		v.	194
grandiflois, Rottb	••	74	arvensis, Lamk.		,,,	194
tricornis, Maingay	"	74	Тичметжаска		v.	192
Thouinia nutans, L		608	Thymus, Linn		Ίν.	649
Thrispermum amplexican'e,			biflorus, Ham		• ••	650
Rehb. f	vi.	40	indicus, Burm		. ,,	610
Rohb. f Arachnites, Rohb. f	,,	41	linearis, Bonth		,,	649
Freemani, Robb, f	"	42	nepetoides, D. Don		-	661
Hystrix, Rohb. f	,,	39	origanifolius, D. D.			651
li'acinum, Rchb. f	,,	40	piperitus, D. Don			651
luniferum, Rohb. f	,,	37	repens, D. Don			651
teres, Rohb. f	"	34	Serpyllum, Linn.			649
usneoides, Rohb. f		37	Thyridostachyum lær			
Thuarea, Pers	vii.	91	Thyrsacanthus indici			497
inacaloda Du		91	Thyrsacanthus (erro			
1-4'6'1'- D.	"	91	Thyrsostachys)		ii 9	421
	,,	91	Thyrsostachys, Gam	lla vii	367	421
media, Br	"	91	Oliveri, Gamble			
sarmentosa, Pers	"	644	siamensis, Gamble		V	397
Thuja orientalis, Linn	v.	646	Thu anathus occupari	Propl	.,,	73
pendula, Lamb	,,,		Thysanachne scopario	i, 110bi	. 11'.	
Thunbergia, Linn. f	iv.	390	Thysanolæna, Necs	··· ···	V 11.	61
alata, Bojer	"	391	acarifera, Arn. & I			
angustifolia, Ham	"	390	Agrortis, Nees			
arnhemica, F. Muell	"	390	maximo, Kuntze		vii.	
coccines, Wall	"	393	Tiarella, Linn			
cordifolia, Nees	"	392	polyphylla, D. Don	, ;;;		399
fragrans, Roxb	"	390	Tiaridium an sophyl	tum, Gi.		123
fragrans, Bot. Mag	,,	391	Don		iv.	152
fragrans, Wall	,,	391	indicum, Lehm.			152
granditiora, Roxb	,,	392	Tiglium Cumingii, K		▼.	391
grandistora, Wall	,,	392	hispidum, Klotz.		,,	388
Harrisi, Hook	"	£92	officinale, Klotz.		,,	393
Hawtayneans, Wall	"	391	punctulatum, Klotz			392
Hawtaynii, T. Ander	"	391	TILIACEÆ	i. 3	,9, v.	200
heterophylla, Wall	"	391	Tiliacora, Colebr			99
javanica, Gærtn. f	"	390	abnormalis, Miers			99
	"	391	acuminata, Miers			99
lævis, Nees laurifolia, Lindl	• •	892	cuspidiformis, Mies			99
inufitoita, Diffice	"		. Carpianjoinio, Mato		"	

Tiliacors ,	Vol.	Page	Toddalia Vol. Page	•
fraternaria, Miers	i.	93	angustifolia, Miq i. 497	1
racemosa, Colebr	,,	99	asiatica, Lamk ,, 497	
TILIEE	i.	380	bilocularis, W. & A ,, · 497	
	ii.	412	floribunda, Wall ,, 497	
	,,	412	mitis, Miq ,, 492	
pharnaceoides, Hochst	,,	412	nitida, Limk ,, 497	
	,,	412	rubicaulis, Willd ,, 497	
Timæosia cerastioides, Klotz			TOUDALIER i. 484	
	<u>i.</u>	217	Tofieldia, Huds vi. 357	
	iii.		himalaica, Baker ,, 358	
	,,	99	nepalensis, Str. & Wint. , 265	
	,,	127	nepalensis, Wall ,, 264	
	,,	127	Tomex, Forsk iii. 619	
	,,	127	glabra, Forsk ,, 619	
	,,	127	Tomes, Linn iv. 567	
	;;	127	tomentosa, Linn ,, 567	_
	vii.	307	Tomex, Thunb 168	-
	vi.	377	Doshia, Ham 163	
	1.	97	pubescens, Willd ,, 163	
javanicum, Miers	,,	97	sebifera, Willd ,, 158	
	;	97	tetranthera, Willd ,, 158	
314 31 341	1.	96	Tonsella disperma, Poir i. 625	
	,,	97	princides, Willd ,, 626	
	,,	96	Toona ciliata, Rem 1. 569	
malabarica, Miers	,,	96	febrifuga, Room ,, 569	
	,,	97	hexandra, Rom ,, 569	
	"	96 97	longifolia, Rœm ,, 569	_
? uliginosa, Miers		94	2	
m	1. iii.	6		
		708	1	
7 1 1 37 11		709	lm 3 1 1 4 .3 . ' - 4 .4	
T	"	708	2 Daymonia Wall 710	
make 'sse'sse	,,	254	Intifoliarin Timm 710	
Tithymalus cognatus, Klot	V. Z. V.	261	Torenia, Linn iv. 275, 734	
1/1		264	alba, Ham iv. 276, 279	
Limelania Viaka	,,	258	asiatica, Linn iv. 277	
Tittmannia angustifolia,	,,	-00	l maindian Dankh	
- ·	iv.	283	asiation Thus	
Ø 1	··	285		
Alaka Damah		280	asiation Wight 970	
Danish	·· ,,	281	Bailloni, Godef ,, 276	
	,,	282		
Adula Damila	. ,,	281	calcarate, Griff , 278	
-1t. Danson	. ,,	259	cardiosepala, Benth ,, 276	
	,,	280		
Dall	., ,,	279	ciliata, Sm ,, 278	_
illa Dandh	,,	281	concolor, Lindl iv. 277, 734	
	,,	281	cordifolia, Roxb iv. 276	
4 * 1 . 4	,;	280	cordifolia, Benth ,, 277	
minana Dalah	,,	280	cordifolia, Wight ,, 276	
sp., Griff	,,	281	diffusa, D. Don 277	
m 7 Th	iii.	111	diffusa, Roxb ,, 282	
	v.	656	edentula, Griff ,, 279	
m	i.	497	edentula, Benth , 276	
	., ,,	497	P exappendiculata, Regel , 276	_
6 .i.c. 7 .	,,	497	flaccida, Br ,, 273	
	••	-	, ,,	

Torenia	Vol. Page	Tournefortia Vol. Page
.flava, Ham	iv. 278	Wallichii, Thw.
flava, Wall	070	3871 1 417 1 3 40
alaham Hem	" 901	1. 7. 2. W. 1.
	″ no=	m : 6 1) 1
1.2. 15 1		Tovaria fusca, Baker vi. 323
himmed Dandl	,, m=10	oleracea, Bakor ,, 323
hirsuta, Benth	, 277	oligopyhlla, Baker , 323
hirta, Cham. & Schl.	,, 281	pallida, Biker , 323
hirtella, Hk . f	,, 277	purpurca, Baker , 323
lepidota, Roth	, 301	Tovicodendrum Cobbe, Giertn. i. 674
longiflora, Morren	,, 277	Toxocarpus, W. S. A iv. 13
lucida, Ham	,, 279	acuminatus, Benth ,, . 15
mollugineides, Benth.	,, 280	concanensis, Ilk. f " 11
mucronulate, Benth.	,, 276	crassifolius, Dalz. & Gibs. " 16
multiflora, Roxb	,, 280	crassifolius, Wight ,, 16
patviflora, Ham. ,	" 278	eriocarpus, Ilk. f , 15
peduncularis, Benth.	,, 276	Griffithii, Dene ,, 13
peduncularis, Benth.	, 279	himalensis, Falc ,, 13
polygonoides, Benth.	, 276	Kleinii, W. J. A ,, 14
racemosa, Benth	, 279	Kurzii, <i>IIk. f.</i> ,, 15
rubens, Benth	iv. 277, 734	laurifolius, Wight ,, 16
rubens, Thw	iv. 277	Roxburghii, W. S. A ,, 14
sessilifora, Benth	" 282	Roeburghii, Griff ,, 15
vagans, Roxb	477	l willows Dana 19
varians, Griff		? Wightianus, Hook. S. Arn. ,, 15
	" 97O	sρ., Griff ,, 13
771 0 0 77		Trachelospermum, Lemaire iii. 667
	970	amillana III. C
sp., Miq	# 49	f
Toricellia, DC	710	
tiliæfolia, DC	W101	
Torilis Anthriscus, Gmel.	ii. 718	Trachycarpus, H. Wdl vi. 435
elata, DC	, 718	excelsa, H. Wdl ,, 436
japonica, DC	, 718	Fortunei, H. Wdl ,, 436
Torresia biflora, R. & S.	vii. 332	khasiana, H. Wdl ,, 436
? latifolia, Beauv	,, 332	Martiana, H. Wdl ,, 436
Tortula aspera, Roxb	iv. 565	Trachydium, Lindl ii. 671
Tournefortia, Linn	iv. 145	di-sectum, Clarke ,, 672
arborescens, Lamk	,, 147	hirsutulum, Clarke " 672
argentes, Linn. f	,, 145	novem-jugum, Clarke , 672
Candollii, Clarke	, 146	obtusiusculum, Clarke , 673
cymosa, Heyne	" 145	Roylei, Linal. (see Errata) ,, 672
Edgeworthii, DC	, 143	sp, Hk. f. & T ii. 672, 673
Heyneana, Wall	, 145	Trachyozus muricuta, Steud. vii. 96
Heyneana, DC	" 146	Trachypogon avenaceus, Necs vii. 182
Hookeri, Clarke	" 147	cænus, Nees " 205
khasiana, Clarke	, 147	fasciculatus, Munro ,, 138
ovata, Wall	" 147	polymorphus, Huck " 210
reticosa, Wight	, 146	Trachys, Pers vii. 96
Roxburghii, Clarke :	iv. 146, 153	mucrouata, Pers " 96
Royleana, DC	iv. 148	mucronata, Steud " 96
whylata Hochet	140	muricita, Stead " 96
subulata, Hochst ternata, Wall	" 147	Trachystachys geminata,
ternata, Wall	147	A. Dietr vii. 96
tetrandra, Bl	147	Tradescantia ophylla, Heyne vi. 375
tetrandra, Wall	" 14B	900
viridiflors, Wall	" 147	barbata, Spreng , 385
viridiflora, Gamble	147	
Walkerse, Clarks	" 147	906
Wallichii, DO	.i. " 147	cristata, Heyne ,, 383

010	•	I IN L. D.A.	L INDEA.	
Tradescartia .	w.	ol. Page	Tragus Vol. Pag	~~
		385		17
		9.07	1	7
		990		
		່		
gangetica, Linn		995) /
	,	208		97
incana, Heyne			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-
	,	970	Trapa, Linn i. 59	
		, 37 9	bispinosa, Roxb ,, 59	
	••• ;	, 382	natans, Linn ,, 59	_
		, 382	quadrispinosa, Roxh ,, 59	
	,	, 390	quadrispinosa, Wall ,, 59	U
.	,	, 385	Treisteria (lapsu Tre teira	
	••• ;	, 387	and Tristeria)	
	,		assamica, Griff iv. 27	
			cordata, Griff ,, 27	
	ri. 38	5, 388	lanceolata, Griff ,, 27	
	v i	i. 380	Trems, Lour w. 48	13
thyrsiftora, Bl	,	, 367	amboineusis, Bl , 48	14
	,	, 369	angustifolis, Bl ,, 48	4
tuberosa, Roxb	,	, 3 86	Burmanni, Bl ,, 48	11
7 17 4 17	,	, 385	? cannabina, Lour ,, 48	14
	,	, 387	orientalis, Bl ,, 48	14
. 11	,	007	politoria, Planch ,, 48	14
(1 :00	··· ,	00.3	timorensis, Bl ,, 48	13
m	v		velutina, Bl ,, 48	14
Tragia, Linn	v	. 464	virgata, Bl ,, 48	13
1. (Taran)	,	405	Trembleya rhinanth. ra, Griff. 11. 52	
	, ,	100	Trentepohlia, Boeck vi. 59	
		100	bifoliata, Boeck ,, 59	_
Al 1 T !		475	Tresteira, vide Treisteria	•
		465		5
		907	1 !!!- 111. C	5
1 - 4 - 4 - D - 1		400	Trevesia, V_{ss}	
1 /2 - 2 1 - Dan 11	,	ACE	l ingignia Wig 79	
7 7 337:11	,	AGE	I malmata I/ii	
to a state of the second secon	,	465	Laurada da Daniel 73	
	,	100	1 mm · **	_
36	,	410		
76' 7' 16 11	,	400		
	,	400	hernantifolia, Roth v. 424, 444 macrophylla, Roth v. 42	
	,		7 721	
rugosa, Wall		9, 466	mudifican Linu	_
	▼		nudiflora, Linn ,, 42	
Tragopogon, Linn	iļ		nudiflora, Wight ,, 42	
	,		polycarpa, Benth ,, 42	_
junceum, wan			rusciflora, Heyne ,, 52	
porrifolium, Linn			tricuspidata, Willd ,, 43	U
pratense, Linn			Triachyrum cordofanum,	_
Tragularia horrida, Kem			Hochst vii 25	
	Vi	i. 96	discosporum, Steud ,. 25	
	,		nilagiricum, Steud ,, 25	
Berteronianus, Schull	,,		Triactina, Hk. f. & T ii. 42	
	,,	97	verticillate, Hk. f. & T ,, 42	3
	,,	07	Triananthus Griffithianus,	
brevicaulis, Boiss	,,	07	Nees iv. 470	0
gracilis, Panz	,,	000	Trianthema, Linn ii. 660	0
Halleri, Doell		^-	crystallina, Vahl ,, 660	
inermis, Panz		0-7	decandra, Linn ,, 66	
•	. "			-

Trianthema	Vol	P ge	Trichilia			B7)	Page
Govindia, Wall.		166Û	venosa, Spreng.			i.	553
1 3	,,	661	? villosa, Wall			19	564
monogyna. Linn	• • • • • • • • • • • • • • • • • • • •	660	TRICHILIFÆ			· 1.	540
alaa Julu Duul	. ,,	660	Trichodesma, Br.				153
- k J - 4 147 - 11	. ,,	660				"	154
manda adan Titan	. ,,	6:0	amplexicante, Roth		··.		153
polysperma, Hochst		661	hirsutum, Edgow.			"	153
polysporma, Oliv		661	in equale, Edgow.	•••		"	154
sedifolia, Vis		660	indicum, Br			."	153
triquetra, Rottl		660	indicum, DC		ď		154
Trias, Lindl,	• • • • • • • • • • • • • • • • • • • •	780	khasianum, Clarke			"	654
		780	perjoliatum, Wall.	•••		.,	153
ovata, Lindl.		781	subsessile, Wall.		···	,,	153
picta, Bent/	. ,,	780					154
Stockeii, Benth		781	Trichodia vareciformi			" "	600
Triathera bromoides, Rot			Trichodium caninum,				
	• v.	762	Trichoglottie, Bl.				42
		758	Dawsoniana, Rchb.				43
	,	760	fasciata, Rehb. f.			"	43
		769	quadricornuta, Kun			"	43
Tribrachys Gardneriana,	. ,,	103	retusa, Bl		· · · ·	,,	43
O1 .	٠ ٢.	666	Trichogyne cauliflora,			iii.	278
		423	Tricholæne, Schrad.		···	v i.	
Tribulus, Linn		423	? fusca, Schult				120
alatus, Del		423	micrantha, Schrad.		· · ·	"	65
cistoider, Linn		423	Teneriffæ, Parlat.			**	65
lanuginosus, Linn		423	tuberculosa, Hack.		• • •	"	65
terrestris, Linn					•••	٠,	65
	. 263,		Wightii, Nees & An		•••	"	65
Trichadenia, Thw		196	sp., Wall Tricholepis, DC	•••	•••	in.	379
zeylanica, Thw		196	ampleviendie Clar	·ka	•••		351
Trichaurus ericoides, W. & A		249	amplexicaulie, Clar	n.c	•••	"	332
	. vi.	611	angustifolis, DC. ('andolleana, Wight	. • • •	•••	"	383
asperrima, Nees	•••	643	elongata, DC		•••	"	380
chæterrhiza, Nees	• • • • • • • • • • • • • • • • • • • •	647			•••	"	380
cinnamometorum, Nees		650	furoate, DC	•••	•••	79.	381
complanata, Nees		646	glaberrima, <i>DC.</i> karensium, <i>Kurs</i>	•••	•••	"	380
curvifolia, Nees		636	Ismusinus, Klass		•••	٠,	380
digitata, Hk. f. & T.	٠,,	648	lanuginosu, Klotz.			11	383
filiformis, Nees		633	montans, Dalz. &			1	000
globulosa, Nees	•••	645	nigricans, Edgew	-			380
junciformis, Nees		647	grescen*) procumbens, Wight	•••	• • •	"	383
latifol a, Nees	٠.,	648	radicans, DC		•••	"	381
miliacea, Nees	• ,,	644			• •	"	383
pentaptera, Neos		645	Roylei, Hk. f spartoides, Clarke		• • •	: 9	332
quinquingularis, Nees	. ,,	644			•••	"	380
Salbundia, Nees	. ,,	646	Stewartei, Clarke stictophylla, Clarke		•••	"	352
scabra, Nees	. ,,	646			•••	"	382
tenella, Nees		642	tibetics, Hk. f. & T.		•••	,";	301
tetragona, Nets	. ,,	644	Trichoon Karka, Roth			·	ov:
torta, N. es		648	Trichophorum arundir			vi.	664
sp., Hk. f. & T. vi. 642, 643	, 545,	040,	Strach		•••		664
		048	comosum, Strach.		• • •	"	661
Trichilia coriacea, Wall	, i.	564	cyperinum, Pers.			"	OUL
? longissimu, Wall	. ,,	552	Trichopodium angusti			e i	297
nervosa, Vahl		553	Lindl cordatum, Lindl.	•••		vi.	297
spinasa, Willd	. ,,	512	coractum, Lindi.	•••	•••	"	297 297
trijoliata, Wall	• 11	564	interme laun, Lindl	•	• • •	"	201
-							

Trichopodium , Vol.	Page	Vol. Page
zeylanicum, Thw vi		Tricostularia fimbristyloides,
		Benth vi. 674
		m + .: 317 31 : 050
zeylanious, Gærtn ,,	297	
Trichosanthes, Linn ii.		, , , , , , , , , , , , , , , , , , , ,
anguina, Linn ,,	610	pilosa, Wall ,, 359
anguina, Wall ,,	607	Tridax, Linn in. 311
aspera, Heyne ,,	606	procumbens, Lina ,, 311
hungtonta Visua	607	Tri ens indicus, Nees vii. 329
	608	Tridesmis, Spach i. 258
cordata, Roxb ,,		forming Parth 958
cordata, Wall ii. 607		1 11 0 1 " 000
Cucumerina, Linn ii	609	ochnoides, Spach ,, 258
cucumerina, Wall ,,	611	pruniflora, Kurz ,, 258
cuspidata, Limk "	609	Tridesmis, Lour v. 389
dicrelosperma, Clarke "	609	tomentosa, Lour ,, 389
divisa Park	609	Trifolieze i. 57
dining Wall	623	Trifolium, Linn i. 86
9 17.4.4 17.4	611	P
? Fatoa, Ham ,,		/
fætidissima, Jacq ,,	627	, , ,
grandibracteata, Kurz "	607	minus Sm ,, 86
granditora, Wall ,,	606	officinale, Willd ,, 89
heteroclita, Roxb ,,	606	pratense, Linn ,, 86
himalensis, Clarke ,,	608	repens, Linn ,, 86
intermifalia Then	610	resupinatum, Linn ,, 86
intendellin Vone	612	109
inneria Bood		7 0 1 00
japonica, Regel ,,	607	
laciniosa, Klein ,,	609	Triglochin, Linn vi 563
laciniosa, Wall ,,	606	maritimum, Linn ,, 563
lobata, Roxb ,,	610	palustre, Linn ,, 563
lobata, Kurz ,,	610	sp., Griff ,, 563
macrosiphon, Kurz ii. 608	3. 610	Triglossum arundina eum,
multiloba, Miq. (see Errata) ii		Fisch vii. 391
a amade the Times	609	Trigonanthus pendulus, Korth. v. 826
·nerviiona, Linn ,,	612	
officinalis, Wall ,,	_	
palmata, Roxb ,,	696	ar _s uta, Vis ,, 87
palmata, Wall ,,	608	brahuica, Boiss ,, 87
pilosa, Wall ,,	609	cachemiriana, Camb " 88
r reniformis, Kurz "	6 19	corniculata, Linn " 88
reniformis, Miq ,,	609	elatior, Sibth. & Sm ,, 88
Dago Jinna Wall	617	10
autoralactions Marcell	607	71. 11/211.3 " 00
Inimania Mia	606	0 1 1 4 W 1
tricuspis, Miq ,,		
iruncata, Clarke ,,	608	, , , , , , , , , , , , , , , , , , , ,
tuberosa, Roxt ,,	608	gracilis, Benth ,, 88
sp., Griff ,,	610	geministora, Bunge " 87
sp., Hk. f. & T ,,	608	hamosa, Linn ,, 88
Trichosma, Linil v.	827	himalaica, Wall ,, 88
cylindripoda, Griff. (error		incisa, Royle " 87
· · ·	827	indian Time " 69
		monantha C A Mayon 97
suavie, Lindl v. 827, v	1	
Trichosporum, D. Don iv		, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
grandiflorum, D. Don ,,	338	obcordata, Wall ,, 88
parviflorum. D. Don ,,	339	occulta, Delile ,, 87
radicans, Nees ,,	343	orthoceras, Kar. & Kir ,. 87
Trichotosia, Bl v.	786	pinnatifida, Cav ,, 87
1.4 6	806	malmanmata Linn " 97
	806	7. January 7. January 90
ferox, Bl ,,		
microphylla, Bl ,,	808	rhytidocarpa, Boiss ,, 88

	· -
Trigoniastrum, Miq i. 208	Vol. Page Tripodanthera cochinchinense,
hwnolenenm Mie 900	_ D
Trigonocarpus littoralis,	m ! n !!
~ 317 11 ~ · · · · · · · · · · ·	hbyssinicus, Nees vii. 287, 422
Trigonochlamys, Hk f i. 539	bengalensis, Munro vii. 287
Caissati Ul. (EOF	huamaidea Dath 997
Trigonopleurs, Hk. f v. 399	bromoides, Benth ,, 287
malayana, $Hk. f.$, 399	capillatus, J. § S , 285
Trigonostemon, Bl v. 395	capitatus, Lisboa ,, 285
diplopetalus, Thw 398	festucoides, Clarke ,, 287
heteranthus, Wight ,, 396	f. stucoi les, J. & S , 287
Hookerianus, Muell ,, 397	finformis, Nees ,, 288
indicus, Muell ,, 398	Griffithii, W. & A " 287
lætus, Baill ,, 397	Jacquemontii, Stap' ,, 286
Lawianus, Muell. v. 394, 403, 404	lanatus, Hochst " 287
longifolius, Baill ,, 396	Lisbow, Stapf ,, 286
malaccanus, Muell v. 396	minimus, Hochst ,, 287
• nemoralis, Thw ,, 398	Nessian's, W. & A , 287
semperflorens, Muell ,, 397	namidana antara Mirani 900
villosus, Hk. f ,, 397 seulanicus. Muell 400	1
Hashari Danth 179	amidantatus Noos 988
microconno Danth 179	Wightii, Hk. f ,, 286
	zeylanicus, Nees " 287
ovalifolia, Benth ,, 172	sp., Hk. f. & T ,, 286
rotundifolia, Benth ,, 172	sp., Lisbos ,, 286
Triguera acerifolia, Cav i. 336	? sp., Wall vii. 243, 288
Trilepis, Nees vi. 698	Tripsacum distachyum, Linu. vii. 96
Roylvana, Nees ,, 698	? semiteres, Wall ,, 101
Trillidium Govanianum,	Tripteranthes pusillus, Wall. v. 665
Kunth vi. 361	Tripterospermum Championi,
Trillium, Linn vi. 361	Gardn iv. 108
Govanianum, Wall ,, 361	trinerve, Bl ,, 107 Trisciadus, Pk. f iii. 94
Tschonoskii, Maxim ; 361	
Trilobaria, A. DC ni. 642 Trilophus, Lestib vi. 220	truncata, Hk. f , 94 Trisepalum, Carke iv. 363
	acutum, Clarke , 364
2 remortant properties, 22 minutes	obrusum, Clarke ,, 363
Triniusa Danthonix, Steud. vii. 362 Triodia ambigua, Br vii. 329	Triselum, Beauv vii. 274
905	æneum, Hack ,, 280
splendida, Steud ,, 233	airoides, R. & S , 278
Triomma, Hk. f i. 528	andinum, Benth ,, 278
malaccensis, Hk. f ,, 528	antarcticum, Trin ,, 278
Triosteum, Linn iii. 8	aureum, Neen ,, 280
himalayanum, Wall. · ,, 8	Cavanillesii, Trin ,, 276
hirsutum, Wall , 8	flavescens, Beauv " 279
hirsutum, Roxb ,, 180	Gaudinianum, Boiss ,, 276
Triphasia, Lour i. 506	granlandicum, Steud ,, 278
aurantiola, Lour ,, 507	(100,000)
Psarmentosa, Bl 509	Buchting the transfer of the property of the p
trifoliata, DC i. 507, 508	23,7,111,7
Triplectrum radicans, W. & A. ii. 548	11 1 77 11 970
Tripleura pallida, Lindl vi. 107	phleoides, Kunth ,, 276 phleoides, Trin ,, 309
Tipiostogia, wast.	spiciforme, Dulac ,, 278
Branch and a state of the state	subspicatum, Beauv ,, 278
glandulosa, DC ,, 215	

Trisetur	•			Page	Triticum	Vol.	Page
toluccense,	Kunth		vii.		polonicum, Linn	. vii.	
valesiacum,	Boiss.		,,	276	repens, Kunth	. ,,	328
rirescens, N	ees		"	277	repens, Linn	. ,,	370
Tristachya, I			vii.	271	sativum, DC		367
barbata, N			٠,	272	sativum, Linn		367
Stockeii, Bo				272	scaberrimum, Steud		363
			'n.	465			367
Tristania, R.		•••		466	0. 1		369
burmannic		•••	"	- : -			368
conferta, G			"	467	sylvaticum, Monch	. ,,	
Griffithii, k			"	467	tenellum, Viv	. ,,	356
Maingayi,	Duthis		,,	467	turgidum, Linn	٠ ,,	367
merguensis	, Griff.		,,	466	unilaterale, Lino	. ,	356
sumatrana.	Miq.		,,	466	vulgare, Vill	. ,,	367
Whiti na,	lapsu Wi	ghtians	١, "		Zea, Host	. "	367
Griff.				466	Triumfetta, Linn	:	394
sp., Griff	•••	··· ji			angulata, Lamk		395
Tristellateia,				418			396
				418			395
australasic			??		Bartramia, Roxb		395
Tristemma an				515	bilocularis, Wall	• ,,	
Tristeria, vid	o Treiste	ria		275	cana, Bl	. ,,	896
Tristicha zey	lanica,	Gardn.	٧.	62	glabra, Hb. Miss	. ,,	895
TRISTICHER .			v.	62	glandulosa, Heyne	. ,,	395
Tritaxis, Bail	ll		₹.	384	indica, Ham	. ,,	394
? Beddom:			"	384	indica, Lamk		396
Cumingii, I	Sezith.		"	384	? microphylla, W. & A		396
zeylanica, N	Inell			400	neglecta, W. & A	•••	396
Tritheca pente			"	569	1 . 1.7		394
			11.	003			393
Trithyrocarpu		-		070	oblongata, Link		395
Hassk.			₹1.	373	orbiculata, Koen	• ,,	
paleatus, H			"	373	ovata, DC		394
Triticoides, G	riff.			698	pentandra, Guill. & Perr	. ,,	396
Triticum, Lin	n		vii.	366	pilosa, Roth	- ,,	394
Ægilops, B			,-	367	pilosa, Wall		301
æstivum, Li			,,	367	pilosula, Thw		396
amyleum, 8				367	polycarpa, Wall i	. 395,	396
benghalense			"	367	rhomboides, Jacquem		395
		•••	"	363			395
bromoides,		•••	"		annalantlaka 7.500	-	396
compactum,		•••	**	867	semitriloba, Linn		
compositum,			**	367	suborbiculata, DC	• ,,	395
dicoccum, S	chrank		,,	367	tomentosa, Bojer	. ,,	391
durum, Des	sf		"	367	tomentosa, Wall	. ,,	395
elymoides, 1			••	368	trichoclada, Link	. ,,	396
geminatum,			"	294	trilocularis, Roxb	. ,,	395
gracile, Bro	t			363	vestita, Wall i	. 291,	395
gracile DC			"	863	TRIUBIDEÆ	• '	558
gracile, DC. hispanicum,	Willia	•••	"	356	Trochisandra indica, Bedd		662
h and alfanna	W-11	••• ···	"	371	· · · · · · · · · · · · · · · · · · ·		39
hordeiforme			"		/m 1 7.1		22
hybernum,			"	367			
lungearistat	u <u>m</u> , J. &	s	"	868	acaulis, Lindl	• ;;	22
macrouru.n,	Turcz.		"	363	americanus, DC	٠,,	22
maritimum,			"	356	laxus, Salisb	,,,	22
monococcum	, Linn.		,,	367	patulus, Salisb	, ,,	22
			"	372	pumilus, D. Don		22
Nardus, DC			"	356	pumilus, Royle		22
murale, Sali Nardus, DC phænicioide	e. DC.			363	Troostwyckia singularis, Miq.		47
pilosum, Da	ວ, ລວວ. ໄຂ່ & ∩∷	···	"	867	Tropoolum pentaphyllum,		-•
prosum, Da	ia. C Gi	Ն Ք	"	868	Lowb	wi.	184
pinnatum, I	TOBITCIT	• • • • • • • • • • • • • • • • • • • •	"	000	Lamk	A 1.	100

▼ .		17-1	Da	Turpinia yo	D
Trophis aculeata, Roth			Page 491	1	. Page 699
aspera, Retz		₹.	489	mantahanian Wall	699
cechinchinensis, Poir.		"	489		699
? Heyneana, Wall		"	488	mamalamaia Wall	699
spinosa, Bl		"	538	nomifore DC	698
spinosa, Heyne			491	Turræa, Ling i.	541
spinosa, Roxb		"	489	alata, Wight ,,	542
taxiformis, Spreng	•••	"	489	alata, Wight ,, prinata, Wall ,,	548
taxoides, Heyne	•••	"	488	duich andulia Min	879
Tropidia, Lindl		vi.	92	villosa, Benn ,,	542
angulosa, Bl	•••	,,	92	virens, Linn ,,	041
assamica, Bl		"	93	virens, Hellen "	512
curculigoides, Lindl.		"	93	Turraya napalensis, Wall vii	
curculigoides, Kurz, lig				Turritis glabra, DC i.	185
Cnemidia		,,	94	riyida, Wall ,,	135
Govindovii, Bl		"	92	Tussilago, Linn iii.	330
graminea, Bl			93	Farfara, Linn "	330
Maingayi, Hk. f		"	93	macrophylla, Wall	891
pedunculata, Bl		"	93	rupestris, Wall ,,	320
semilibera, Bl	•••	,,	92	Tylophora, Br iv.	39
Thwaitesii, Hk. f.		,,	93	asthmatica. W. & A	44
sp.,		"	94	asthma'ica, Wight "	28
Tryphera.prostrala, Bl.		iï.	662	Belostemms, Benth ,,	48
M	•••	٣.	654	capparidifolia, W . & A ,,	41
Brunoniana, Carr		,,	654	carnosa, Dalz. & Gibs "	44
Tulasnea foliosa, Wight		v.	63	carnosa, Wall "	42
ceylanica, Wight, laps	u			cordifolia, Thw ,,	44
Terniola		,,	62	Dalzellii, Hk.f "	48
Lawii, Wight	•••	,,	63	exilie, Coleb ,,	44
pedunculosa, Wight		,,	63	fasciculata, Ham ,,	40
ramosissima, Wight	•••	"	63	fasciculata, Ham ,, fasciculata, Thw ,,	40
Tulipa, Linn		vi.	351	$\mathbf{globifera}, Hk. f. \dots ,,$	41
		,,	355	Govanii, Dene ,,	40
Clusiana, DC	•••	"	355	Helferi, $Hk. f$,	40
<i>Lehmanni</i> ana, Merckl.		,,	355	$\mathbf{himalaica}, Hk. f. \dots ,$	42
stellata, Hook	•••	"	355	hirsuta, Wight ,	48
undulata, Jacquem.		,,	355	Iphisia, Dcne ,,	40
TULIPEÆ		vi.	301	Jacquemontii, Done,	43
Tunga diandra, Roxb	•••	vi.	678	longifolia, Wight ,,	42
lævigata, Roxb	•••	"	667	$\mathbf{macrantba}, \underline{Hk}.f. \dots \dots ,,$	40
triceps, Roxb	•••	,,	667	micrantha, Ttw ,,	42
Tunica, Scop	•••	i.	215	microstachys, Hk. f ,,	788
stricta, Bunge	•••	"	216	mollissima, Wall ,,	43
Tupidanthue, Hk. f. & T.	•••	ii.	740	mollissima, Wight ,,	48
calyptratus, Hk. f. & T.	•••	"	740	pauciflora, W. & A,	41 40
	•••	vi.	324	pauciflora, Hohen ,,	40
	•••	,,	325	pauciflora, ? Hk. f. & T ,,	44 45
	•••	,,	325	pubercens, Wall ,,	
	•••	,,	825	purpures, Wall ,,	41 43
	•••	"	324	rotundifolia, Ham ,,	44
	•••	"	325	tenerrima, Wight ,,	42
	•••	,,	324	tenuis, Bl ,,	48
	•••	"	325	tenuissima, W. & A "	48
	•••	,,	325	nillosa, Bl ,,	45
? sp., Griff	•••	.;;	325	Wallichii, Hk. f "	42 42
	•••	ij.	719	zeylanica, Dene ,,	7
Turpinia, Vent	•••	i,	698	sp., Miq	•

	Vol.	Page	/ Vol. Pag	28
Tylostylik sp., Bl	₹	802	Umbilicus fimbriatus, Turoz. ii. 41	
Typha, Linn	٧i.	488	luteus, Done ,, 41	ĥ
augustata, Chaub. & Bory		489	Orendes, Done ,, 41	6
angustifolia, Kurz	,,	489	radicans, Klotz ,, 42	O
angustifolia, Linn	,,	489	spathulatus, Hk. f. & T ,, 41	6
angustifolia, Thw	"	489	spinosus, DC ,, 41	6
elephantina, Roxb	"	489	spinosus, Turcz ,, 41	6
javanica, Schnizl	,,	489	Uncaria, Schreb iii. 2	8
latifolia, Edgew	"	489	acida, Roxb ,, 3	3
latifolia, Moon	,,	489	acida, Kew distrib ,, 3	1
Laxmanni, Lepech	,,	489	attenuata, Korth ,, 29	9
Maresii, Balland	,,	489	brevispina? Kew distrib ,, 3	1
Martini, Aitoh	,	439	сипевсепя, Korth ,, 2	9
minima, Kurz	,,	489	cirrhiftora, Roxb ,, 3-	ŧ
sten phylla, Rohrb	,,	489	dasyoneura, Korth " 3	l
Турнаска	V1.	488	elliptica, Br ,, 3:	l.
Typhonium, Schett	٧i.	509	ferres, DC 35	3
brovipes, IIk. f	,,	511	ferruginea, DC ,, 28	3
bulbiferum, Dalz	,,	511	jerruginea, Kurz ,, 28	3
crenatum, Schott	"	512	Gambier, Roxb ,, 31	Ĺ
cuspidatum, Bl	,,	511	Gambier, Thw ,, 31	L
divarioatum, Done	٠,	510	Gambier, Wall ,, 29)
diversifolium, Wall	,,	510	Hallii, Korth ,, 28	3
fallax, N. E. Br	,,	511	homomalla, Miq ,, 30)
flagelliforme, Bl	,,	511	Hor:fi-ldiana, Miq ,, 33	3
foliolosum, Engler	"	510	insignis, DC ,, 28	3
gracile, Schott	,,	512	jasminiflora, Well ,, 32	3
Hucgelianum, Schott	.,	510	lævigata, Wall " 30)
javanicum, Miq	,,	510	lanosa, Wall ,, 33	3
minutum, Bl	,,	513	Lobbii, Hk . f , 33	\$
minutum, Schott	٠,	512	macrephylle, Wall, 32	
Motleyanum, Schott	,,	510	ovalifolia, Roch ,, 30	
orixense, Schott	,,	E09	? ovalijolia, Roxb " EC)
pedatum, Schott	••	511	ovata, <i>Br.</i> ,, 29	
redatum, Schott	,,	511	pedicellata, Roxb ,, 2	
Roxburghii, Schott	٠,	510	pedicellata, Bl, 28	
siamense, Engler	٠,	509	pedicellato, DC ,, 28	
trilobatum, Schott	, ,	509	pilosa, Roxb ,, 32	
triste, Griff	,,	509	pilosa, Wall ,, 30	
Tytonia natans, G. Dou	1.,	483	pteropoda, Miq " 29	
		1	Roxburghiaua, Korth , 32	
ULMER	♥.	477	sclerophylla, Rotb ,, 28	
Ulmus, Linn	v.	480	sclerophylla, DC ,, 28	
campestris, Linn	"	480	sclerophylla, Dolese ,, 29	
erosa, Roth	"	480	sclerophylla, Wall ,, 28	
erosa, Wall	"	480	sessilifolia, Roxb ,, 32	
Hookeriana, Planch	"	480	ar ssilifructur, Roxb , 30	
integrifolia, R. xb	"	481	speciosa, Wall ,, 28	
lævigata, Royle	"	180	Uncifera, Lindl vi. 54, 179	
lancifolia, Roch	"	480	acuminata, Lindi vi. 65	
parvifolia, Jacquem	"	481	obtusifolia, Lindl " 65	
pedunculata, Hk. 1. & T.		480	Uncinia cur. para, J. Gay vi. 712	
pumila, Bk. f. & T	••	481	mic oglochin, Spreng ,, 712	
virgata, Roxb		481	nepalensis, Nees ,, 712	
Wallichiana, Planch	••	480	Ungeria monocephala, Nees vi. 597	
Umbellifera, Griff ii. 6			Uniola bipinnata, Linn vii. 325	
Umbellifer	11.	665 I	indica, Spreng " 317	

Uniola		Page	Uraria	_			Page
lappacea, Trin	vii.		Lagopue, DC			≇i.	1.6
TT T.!	,,	328	lanceolata, Grah.	• • • •	• • •	,,	116
Unona, Linn	1.	58	leptostachya, Wall	• • •	• • •	. "	156
Alphonsii, Wall.	,,	62	linearis, Hassk.	•••	•••	"	155
	,,	60	obcordata, Miq	•••	•••	"	166
anakinakinanaia DO	,,	59 4	picta, Desv	•••	•••	,,	155
cochinchinensis, DC.	,,	59	picta, Wight		•••	"	155
ominisa Wh. 1.10	,,	59	prunellæfolia, Gra		•••	"	157
Desameschele Di	,,	61	repanda, Wall		•••	"	156
Dasymaschala, Bl	•• ,,	61	retrofracts, Wall.		•••	"	160
desmantha, Hk. f. S. T.	,,	61	relusa, Wall.		•••	13	156
	,,	59	? styracifolia, W. &		•••	,,,	170
J., D.,	,,	59	Urceola, Rozb		•••		657
Danilii Wall	,,	5 9	brachysepals, Hk	-	• • •	"	659
Danalii Ule e sem	,,	5E 59	elastica, Roxb elastica, Wall	•••	٠.	17	657 658
ologona Thu	•• ,,	58	esculenta, Benth.	•••	•••	,,	658
	• ''	59	luoida, Benth	•••	•••	"	658
J.: A 100	,,	47	Maingayi, Hk. f.	•••	•••	"	658
A Am. Direct	,,	54		•••	•••	"	658
1	., ,,	63	malaccensis, Hk. f. torulosa, Hk. f.		••	: >	659
1. Alkalia III. C Va m	,,	60		•••	•••	ï.	329
T 11 111. A (- //)	•• ,,	59		•••	•••		329
7	,,	56	cana, Wall cordata, Hb. Heyne		•••	"	330
	,,	61	Hamiltoniana, Wal		•••	"	330
37 TO	,,	50	heterophylla, Sm.		•••	"	330
74 D	,,	56	Luppago, DC	•••	•••	"	830
· n 1	,,	£8	lobata, Linn	•••	•••	"	329
	,,	59	morifulia, DC		•••	"	330
177. f % /T	,,	60	muricata, DC		•••	"	300
TTI. # 0. /D	,.	60	palmata, Roxb		•••	"	329
	,,	60	repanda, Rozb			,,	830
	,,	55	rigida, Wall			"	330
174 . 117 . 11	"	59	rigida, Wall			"	330
· / Ó1	,,	57	scabriuscula DV.			"	329
110 111	,,	60	scabriuscula, Wall.			"	329
	•• ,,	58	sinuata, Linn			"	329
**	. 1.	46	speciosa, Wall	•••		"	330
Uralepis Drummondii, Steue			tomentisa, Wall.	•••		"	330
	,,	329	URENEÆ			i.	318
N 17 4 h	,,	33 f	Urera Commersoniana			٧.	550
· · · · · · · · · · · · · · · · ·	i.	584	crenulata, Wedd.	•••		,,	550
	vi.	198	giganteu, Gaud.			,,	550
•	j i .	155	javensis, Gand.			"	550
	"	156	Urgiuea, Steinh:			vi.	347
	,,	156	congesta, Wight	•••		,,	348
	,,	155	coromandeliana, I			,,	347
74 11 15	,,	156	coromandeliana, W	ght	vi.	316,	3 + 7
	,,	155	indica, Kunth			,,	347
317	,,	157	indica, Wight			,,	318
31.6 11 1T/ .//	,,	157	polyphylla, Ilk. f.	• • •		"	348
• • • D	,,	155	senegalensis, Kuutl	ı		"	317
	,,	156	Wightiana, Hk. f.			"	347
hamosa Wull	,,	156	Urochloa cimicina, K	u th		vii,	64
hamosa, Wall	,,	156	mauritiana, Bojer	•••		"	86
lagopodioides, Wall	,,	156	panicoides, Beauv.	•••	•••	,,	35
	,,	156	paspaloides, l'resl	•••		,,	83
	••		-				

Urochloa	Vol.	Page	Urestizma	1	V .1.	Page
pubescens, Kunth	vii.		globosum, Miq			503
semi-alata, Kunth	"	64	infectorium, Miq			516
Uropetalum concanense, Baker	νi.	346	Karet, Miq		v.	,503
hydsuricum, Edgew	"	347	lacci erum, Mig		,,	504
montarum, Dalz	"	346	Jambertianum, Dalz. &			516
se otinum, Ker	"	346	Lambertianum Miq.		"	516
Urophyllum, Wall		97	leucocarpum, Miq		,,	516
arboreum, Korth	,,	98	lucescens Miq		,,	516
biloculare, Kurz	"	125	Manok, Miq		,,	503
Blumeanum, $Hk. f.$,,	99	microcarpum. Miq	•••	,,	511
rzoriaceum, Miq	,,	112	mod stum, Miq		"	512
ellipticum, Thw	"	97	moaestum, Thw	٠	73	512
glibrum, Wall	,,	98	Moritzianum, Miq	• • •	"	511
glabrum, Wall	"	99	mysorenss, Miq	• • •	33	500
Griffithianum, Hk. f	"	98	nervosum, Miq	•••	,,	512
hirsutum, $Hk.f.$	"	18	nitidum, Miq	• • •	٠,	511
longifolium, Hk. f	"	99	nudum, Miq		• •	508
parciflorum, Wall	"	99	obtusifolium, Miq	•••	"	50X
repandulum, Miq	"	98	obversum, Miq	•••	"	501
streptopodium. Wall	"	99	odoratum, Miq	•••	"	508
streptopodium, Wall	"	99	onustum, Miq	•••	"	503
strigosum, Kurz	"	99	avoideum, Miq	• • •	"	511
villosum. Wall	"	99 .	parvifolium, Miq	• • • •	**	511
zeylanicum, Thw	"	98	peracutum, Miq	• • •	"	503
		8, 99	persecefolium, Miq	•••	"	516
Urostachya, Lindl	▼.	785	p losum, Miq	••	;;	501
Urostigma aramptophyllum,		F07	pisiferum, Mi 1	•••	"	511
Miq	٧.	507	pi ocarpum, Miq	•••	"	510
ægeirophyllum, Miq	"	516	pruniforme, Miq	•••	"	502
affine, Miq	"	513	Pseud Benjamina, Mi	•	"	515
altissimum, Miq	"	504	? Pseudo-rubrum, Miq	•••	,,	507
Ampelos, Dalz. & Gibs	"	497 502	Pseudo-Tjiela, Miq	•••	17	515 513
annulatum, Miq	"	518	re'igiosum, Gasp	• • • •	"	511
apiocarpum, Miq	"	514	retusum, Miq		"	510
Arnottianum, Miq	"	499	rhododendrifolium M	•	"	505
bengalense, Gasp	"	508	rigidum, Miq	•••	••	506
Benjamina, Miq		501	rube cens, Miq	• • • •	"	513
bicorne, Miq	"	502	Rumphii, Miq	•••	"	501
biverrucellum, Miq	"	511	subcuspidatum, Miq. sundaicum, Miq	•••	"	507
canaliculatum, Miq caulobotryum, Miq	"	514		•••	"	516
	33.	514	771' - 1 1 - 34'	•••	**	514
ceytonense, Miq chrysothria, Miq	"	501	Tjiela, Miq		507,	
circumscissum, Miq	"	508	Tjiela, Thw		₹.	509
connivens, Miq	"	501	tomentosum, Miq		,,	501
conocarpum, Miq	".	502	truncatum, Miq		"	507
consociatum, Miq	,, .	505	validum, Miq	•••		503
cordifolium, Dalz. & Gibs	"	514	volubile, Dalz	•••	»,	497
cordifolium, Miq	"	513	Wightianum Miq		514,	
courtallense, Miq	",-	514	xylophyllum, Miq	•••	y .	504
dasycarpum, Miq	"	500	Urtica, Linn		٧.	547
depressum, Miq	"	502	acerifolia, Zeuk		,,	551
elasticum, Miq	"	509	offinis, Hk. & Arn	•••	"	549
euneuron, Miq	"	512	alienata, Linn	•••	"	581
flavescens, Miq	"	502	amæna, Wall	•••	"	545
glabellum, Miq	"	511	angulata, Bl	•••	"	555
glaberrimum, Miq	"	506	angustata, Bl	•••	"	590
• • • • • • • • • • • • • • • • • • • •	••					

Urtica		V ol.	Page	Urtica	,	Vol	Page
angustifolia, Ham	•••	₹.	577	parviflora, Ham.		. v.	
anişophylla, Wall	•••	,,	552	pauciflora, Hochst.			598
appendiculata, Wull.	•••	"	589	peduncularis, Sm.			•••
aquatica, Moon		"	575	Pilea			557
ardens, Link		·))	548	> penduliflora, Wall.			577
bicolor, Roxh			591	pentandra, Rexb.		,	583
P bicolor, Wall		"	590	pentandra, Wall.			583
blanda, Wall		"	579	peploides, Wedd.			554
bracteata, Wight	•••	"	585	pilulifera, Linn.	• • • • • • • • • • • • • • • • • • • •		548
candicans, Burm		"	577	platyphylla, Ham.	•••		578
caudata, Burm	•••	"	578	polystachya, Wall.			579
and data Wall	•••	"	585	pulcherrima, Roxb.	••• ••		588
caudigera, Wall	•••	"	579	pulcherrima, Wall.			577
Ohinia Ham		"	581	punctata, Ham.			581
Olimber III	•••	"	550	Davis II am	•• , ••		592
a/m 387 - 11	•••	"	579	rivularis, Schlecht.	••• ••	• • • • • • • • • • • • • • • • • • • •	593
	•••	"		rugosissima, Reinw	• • • • • • • • • • • • • • • • • • • •	•	578
	•••	"	550	rugosula, Wall.			577
31	•••	"			••• · ·		
dinamakalin Timb	•••	"	548	sanguinea, Bl	•••	• • •	58I
diversifolia, Link	•••	"	550	scabrella, Roxb.	•••	. ,,	578
evitata, Wall	•••	"	549	scripta, Ham			556
foliolosa, Wall	•••	"	585	sinuata, Bl	•••		550
frutescens, Roxb	•••	,,	590	smilacifolia, Wall.	•••		558
gigantea, Poir	•••	"	550	spicigera, Stoud.	•••	.,	549 580
glaberrima, Bl	•••	"	553 581	squamigera, Wall.	•••	• • • • • • • • • • • • • • • • • • • •	555
glomerata, Wall	•••	,,	553	stipulosa, Miq			580
Goglado, Ham	•••	"	588	subperforata, Wall.	•••		581
grossa, Wall		:20		suffruticosa, Roxb.	•••	"	545
Hamiltoniana, Wall.		•	579 550	superba, Wall			577
heterophylla, Vahl		v.	550 551	tenacissima, Roxb. ternata, Heyne	•••	,,	584
heterophylla, Wight	&:	"	001	4		• • •	587
himalayensis, Kunth Bouché			548	trinervia, Roxb.	•••	11	557
1	•••	"	583	triplinervis, Ham.			556
1 (7 70)	•••	"	586	17		"	557
7 '7 T'A	•••	"	550	triplinervis, Wall.		"	581
hygrophila, Miq	•••	"	558	tuberosa, Roxb.		**	582
hyperborea, Jacquem.	•••	"	548	umbrosa, Wall	•••	"	556
70	•••	"	589	'043			578
interrupta, Lipp	•••	"	549	urophylla, Wall.		"	590
javanica, Bl		"	549				577
leucophylla, Wall	•••	"	591	777 11		577,	579
lomatocarpa, Hochet.		"	549	` ` ` ` `	· · · · · · · · · · · · · · · · · · ·	₹.	590
longifolia, Burm		"	590			,,	582
mucrostachya, Wall.	v. 5	77.	578	vesicaria, Roxb viminea, Wall	v.	576,	581
mulabarica, Wall		v.	575			₹.	548
microphylla, Linn		,,	551	zey/anica, Burm.		27	551
mollissima, Bl		"	589	sp., Griff		,,	574
m ricata, Hey : c	•••	,,	590	URTICACEE		٧.	477
nana, Ham		"	581	TT		493,	
naucleiflora, Roxb		"	545			v.	479
	•••	"	577	Usubis triphylla, Burn		įi.	674
nivea, Linn obesa, Wall		"	554	Utania morindæfilia, (84
palmata, Forsk		"	550			iv.	7
palmata, Leschen	•••	,,	551	salicifolia, Bedd.		v. 7, iv.	
paniculata, Royle	•••	,,	556				325 381
parviflora, Rozb	•••	"	548	acuta, Benj	•••	**	W() L

3 _ 3		-				•	
Utricelaria (Val	Page	Utricular's	'	Vol.	Pege
		. iv.	Page 850	orysetorum, Miq		iv.	881
alaka Dani			883	pancifolia, Benj	•••		885
		,,	385	pedicellata, Wight		",	381
albiflora, Griff.	•••	,,	380	peticettuta, Wight	•••		332
albo-corulea, Dals.		,,		polygaloides, Edgew.	•••	•••	
		,,	885,	pterosperma, Edgew.	•••	"	829
	٠	,,	380	punctata, Wall	•••	"	829
	•••	•• ,,	329	? purpurascens, Grah.	•••	,,	881
bifida, Linn	•••	. ,,	832	pusilla, Grah	•••	**	334
<i>bifida</i> , Wight	•••	,,	333	racemosa, Wall	•••	"	333
bistoru, Roxb		,,	829	ramosa, Vahl	•••	"	335
		,,	332	reticulata, Sm	•••	,,	831
Til		,,	829	roses, Edgew	•••	,,	3 38
brachiata, Oliv.		,,	333	Rosburghii, Spreng.		"	3 29
		,,	330	scandens, Benj		٠. "	832
		"	832	scandens, Benj	•••	,,	332
campestris, Miq.		,,	333	setacea, Wall		332,	333
capillacea, Thw.			332	squamosa, Benj		' i▼.	835
			332	squamosa, Wight	•••		881
		-	382	Smithiana, Wight		•••	831
		•• ••	832	1 11 1 1 7 7 7	•••		328
		,,	385		•••		829
		,,		Thonningii, Schum.	•••	••	
corales, Linn	••• •	,,	331	uliginoides, Wight	•••	"	831
	•••	,,	888	uliginosa, Wight	•••	"	331
	•••	,	331	verticillata, Benj	•••	"	333
complanata, Wall.	•••	,,	333	volubilis, Wight	•••	"	332
conferta, Wight		,,	831	Wallichiana, Wight	•••	,,	332
confervifolia, D. Doi	a.	,,	329	Wallichiana, Benj		,,	332
decipiens, Dalz.		,,	330	Wallichiana, Wight		,,	332
diantha, A. DC.		,,	3 32	'sp., Oliv		"	331
		,,	329	Uvaria, Lian		i.	47
114 50 1		,,	329	axillaris, Roxb	•••	"	56
1	•••		32 9	bicolor, Rozb	•••		80
1 4 70		•• ,,	329	bicolor, Wall	•••	"	81
			329	bracteata, Roxb	•••	"	49
			329	cauliflora Wall		"	66
		,,	383	1 . n	•••	"	64
		**. 27	329		•••	"	49
		"	335	cordata, Wall	•••	"	
		,,	834	cortacea, Vani	•••	"	51
		,,		costata, Wall	•••	"	67
		,,	334	dioica, Rozb	• • • •	,,	87
graminifolia, Grah.	•••	,,	881	dulcie, Dun	•••	"	48
P graminifolia, Vubl	•	,,	831	elegans, Wall	•••	"	82
- W	•••	,,	881	elliptica, A. DC	•••	"	92
		,,	332	excelsa, Wall farcta, Wall	•••	"	. 77
humilis, Heyne		,,	332	farcta, Wall	•••	"	56
inæqualik, Benj.		,,	329	ferruginea, Ham		"	52
instera, Forsk		,,	329	fornicata, Rozb		"	71
kamaonensis, Oliv.		,,	334	fulgens, Wall	••.	",	82
		. ,	335	fulva, Wall	•••	,,	79
macrocarpa, Wall.		. ,,	328	gigantea, Wall		,,	75
macrolepis, Wight		. ,,	832	Gomeziana, A. DC			49
			830	grandiflora, Roxb		••	47
minutissima. Vahl		•••	884	hamata, Roxb		"	54
		"	334	Hamiltoni, Bk. f. & T	•••	"	48
		,,	838	heterolite Dork		•••	
		. ,,	335	heteroclita, Roxb			45
		** 17		Heyneana, Wall		33	77
orbiculata, Wall.	•••	. 17	884	Heyneana, W. & A	•••	37	51

Uvaria		Page	Uvularia	•	Vol.	Page
hirsuta, Jack	. i.	48	multiflora, Reinw	•	vi.	Page 860
javana, Dun	, ,,	48	parviflora, Wall.		,,,	360
lanuginosa, Wall	***	79	174 Yee. 11			360
latifolia, Bl		79	TT			
Lobbiana, Hk. f. & T		49		•••		
longifolia, Lamk	•••	62	VACCINIAGER		###	442
lurida, Hk. f. & T		50	77 1 1 2 0 14		447,	
lutea, Roxb		89			iii.	
lutea, Wall j.	51, 77	7 89				
	,,,,,,	82	acuminatum, Kurz .	•• •••		455
		49			"	458
macrophylia, Rowb	• • •		arbutoides, Clarke .		"	458
macropoda, Kk. f. & T	* **	50	ardisioides, Hk. f.		"	452
manubriata, Wall	"	79	auriculatum, Kurz .		,,	444
micrantha, Hk. f. & T	:)	51	bancanum, Miq.		,,	454
mollis, Wall	,,,	58	bracteatum, Thunb		,,	454
Narum, Wall	• 99	50	campanulatum, Kuri		,,	449
nervosa, Wall nutans, Wall	"	7.1	chinense, Champ		"	455
nutans, Wall		72	Donianum, Wight .		,,	453
obovata, Heyne		75	Dunalianum, Wight		"	453
ohtusa, Bl		76	eraristatum, Kurz			454
odorata, Lumk		56	glauco-album, Hk. f.		"	453
. 7	•	54	Griffithianum, Wight		"	454
7 . 7		72			"	458
		49	gualtherizefolium, H		, 33	
ovalifolia, Bl	"	_ :	hirsutum, Wight		"	443
oryantha, Wall	"	83	Leschenaultii, Wight		"	455
parviflora, Hk. f. & T	17	51	loranthiflorum, DC		**	446
pauciovulata, Hk. f. & T.	"	51	macrostemon, Kurz.		,,	443
polyantha, Wall	"	81 ·	malaccen e, Wight		"	454
prismatica, Wall	,,	81	microphyllum, Bl		"	458
ptychocalyx, Miq	,,	49	miniatum, Kurz		,,	445
purpurea, Bl	"	47	nilgherrense, Wight		1)	454
reticulata, Bl	"	77	Nummularia, Hk. f. d	Υ T.	,,	451
Rosburghiana, Wall	"	71	obovatum, Wight		"	447
rubiyinosa, A. DC		79	odontocerum, Kurz		"	44-
	"	89	odontocerum, Wight			446
sclerocarpa, A. DC	i. '52		pumilam, Kurz		"	451
someon put II. IV. f. l. T	i.	49	retusum, Hk. f		"	451
semecarpifolia, Hk. f. & T.		80	rotundifolium, Wight		"	455
spkærocarpa, Bl	"				"	443
sphenocurps, Hk. f. & T.	"	48	Roylei, Kurz		"	
suberosa, Roxb	"	65	salignum, Hk. f		"	444
subrepanda, Wall	"	50	serpens, Wight	• • • • • • • • • • • • • • • • • • • •	"	449
sumatrana, Hk . f . $& T$	"	51	forraium, Wight .		"	452
tomentosa, Roxb	"	88	sikkimense, Clarke		,,	451
trichomalla, Bl	. 11	48	Sprengelii, Wall		,,	447
tripetala, Roxb	,,	72	rari gatum, Kurz		,,	416
velutina, Dun	"	87	venosum, Wight		,,	452
ventricosa, Roxb	"	89	verticillatum, Wight		"	448 -
villosa, Roxb	"	87	Wallichianum, Wight		"	443
		57	Vachellia Farnesiana, V			292
	"	51	? Vahea gummifera, l'oi		iii.	
zeylanica, Linn	"	75	Vahlia, Thunb		ii.	899
<i>sp.</i> , Griff	?"	46	A1 1 1 TA			899
UVARIBE	j.		oldenlandio: DO		"	899
Uvularia Betua, Ham		859			"	899
calcarata, Wall	"	359	sessiliflora, Wall		"	
ahinansis, Kar	. "	860		• •••		899
Hamiltoniana, Wall. V1.	859,			. ,	"	899
Leschenaultiana, Wall	₹i.	860	Weldenii, Rohb	• • • • • • • • • • • • • • • • • • • •	"	399

. 17	al Dem	_ 1	1	Vol. Pa	
Valerians, Linn i	ol. Pag ii. 21	Vallisneria, Linn.		•	6ō
manuschunder Damla	919				59
B 74 16. 11 127 13	v. 291			"	BO
`~ 1111	ii. 214			"	80
	911			. "	80
	. 01		•••	' " مَا	59
landarda Danla	" 916		•••	`_" ā	58
	" 91 <i>4</i>			i. 49, 17	
	"			• •	58
	700		.··· ··		51
	::		••• ••	" "	26
Q10108, Littin 1	ii. 211 211		··· ••	' "	52
1-1 9 7	"		•••	. "	54
	" 218 " 212		•••	"	27
77	" 010				
	, 218		•••		51
	,, 218		•••	"	50
	,, 218		•••		51
Hoffmeisteri, Klotz	,, 219		***		58
	,, 214	congesta, Lindl.	•••	. "	38
Jaeschkei, <i>Clarke</i>	,, 212		:	"	58
Jatamansi, Jones	,, 218		ğ Rohb		51
Jatamansi, Wall,	,, 211		•••	. ,, .	58
javanica, Bl	,, 218		•••	• • • • • • • • • • • • • • • • • • • •	32
Leschenaultii, DC	,, 214	l fimbriata, Gardn.		. "	32
? Lindleyana, Wall i	v. 2 90) fusco-viridis, Lindl.			54
microphylla, Bedd i	ii, 2 14	gigantes, Lindl.			27
Massil Am	,, 21	3 Griffithii, Lindl.			53
: 40 -1 11 T J	" 21 1	Hookeriana, Rohh.			50
aliannika Dalaa	" ` 2312	Lindleyana, Griff.			27
	" 21	l I longifolia, Lindl.			32
	" 21				32
10 1-1 27 -i	" 21:	obliqua, Wall	***		B1
Guina Wali	,, 218		Rchb. f	. "	<u>.</u>
Shore about Olemba	" Q14				50
4	" 213			. "	26
	" 218		•••	. "	80
	" 010			• "	58
Wallichii, DC	" 216 " 218		•••	. "	52
sp., Hk. f. & T iii. 2	i 2 , 218			. ,,	98
_ • • • • • • • • • • • • • • • • • • •	iii. 210				54
	iii. 214				58
A. I. a. D. Jan	011			• "	49
	" 01		•	. ,,	52
	" OT			` "	50
	" 21		•••	"	28
	., 214			' "	56 54
Szovitziane, Fieck. & Mey.	"		··: ··		
V			•••		87
Panceps, Wall.	" 6 12		••• ••	"	54 10
	, 659 - 916			. "	5 2
	v. 216	Wightii, Rchb. f.	•••	"	54
	ii. 650		••• ••		51
	,, 650	sp., Jones			52
	" 651	VANDER	▼. 668,		
	,, 652	** **	•••	-	79
Maingayi, Hk. f	,, 651		•••		79
	,, 651				
Pergulaua, Burm	,, 651	cordifolia, G. Don	•••	. " 20	3 2

Vandellia		Page	Vateria	•	₩q	l. Pego
	i▼.	279	disticha, Thw	•••	1	. 308
	,,	280	elegans, Thw	•••	•••	, 317
	,,	281	Gardueri, Thw.	•••	•••	, 814
erectà, Benth	,,	280	indica, Linn	•••	,	, 313
hirsuta, Benth	,,	280	indica, Thw			, 313
Hookeri, Clarks	,,	280	juounda, Thw			, 314
lana Donah	,,	281	lanceæfolia, Roxb.			, 302
mindma Danah	,,	282	lanceolaria, Roxb.	•••		, 302
		28L	lanceolata, Thw.	•••		016
malluminaidea Daudh		279	lanceolata, Roxb.	•••		808
		281	lancifolia, Thw.	•••		91.
	,,	280	malabarica, Bl	•••		010
7424 TT1- 4 B.M	,,	280	Moonii, Thw			" 91A
	,,	282	*. * * /272	•••		918
	,,	259	oblongifolia, Thw.	•••		915
	,,	282		•••		016
	,,		petiolaris, Thw.	•••		,,
	#	281	reticulata, Thw.	•••	•••	, 316
	,,	282	rigida, Thw	• • • •	•••	, 315
	,,	281	Rosburghiana, Wi		•••	,, 302
sessiliflora, Benth	,,	282	scabriuscula, Thw.	•••	•••	,, 808
Vangueria, Juss	iii		Wightii, Thw	•••	•••	, 314
Patroviridis, Wall	,,	133	Vatica, Linn		•••	i. 301
edulis, Miq	,,	136	acuminata, A. DC.		•••	,, 314
. 3 . 7 / 37 . 3.1	,,	136	atfinis, Thw		•••	" 30 3
	,,	132	Canaca, Ham		•••	,, 302
	,,	136	canaliculata, A. D	σ.		,, 815
0 1' 1 161	,,	123	chinensis, Linn			,, 302
17		136	P cordifolia, Thw.	ride		
		136	cordifolia			i. 3 03
	,,	136	? distiona, A. DC.			,, 308
	•	136	faginea, Dyer	•••		"
	,	132	Gardneri, A. DC.	•••		" 21 <i>4</i>
	iii. 2 0		grandiflora, Dyer	•••		ິ່ 9∩1
			Helferi, Dyer			" a∩a
		91	laccifera, W. & A.	•••		″ 20×
	,,	91	lancessfolia, Bl.			" 9∩9
	,,			•••		" 91K
	,,	90	lanceolata, A. DC.			" ຊ ຸດຈ
	,,	91	Maingayi, Dyer	•••		" 01 <i>Q</i>
	,,	.90	Moonii, A. DC	•••	•••	316
	,•	90	nitida, A. DC	•••	•••	" 91K
	,,	63	oblonga, A. DC.	•••	•••	306
rubiginosa, Griff	,,	89	obtusa, Stend	•••		**
Walkerize, Wight	,,	90	pallida, Dyer	•••	•••	,, 302
Wightiana, Lindl	,,	90	petiolaris, A. DC.	•••	•••	, 315
~ · · · ·	,,	91	reticulata, A. DC.		•••	" °16
777 11	,,	91	rigida, A. DC.	•••		,, 315
	i.	186	robusta, Steud	•••	•••	,, 306
	,,	188	Roxburghiana, Bl		•••	,, 302
	▼		scabriuscula, A. I	OC.	•••	,, 303
	i.	313	Scaphula, Dyer	•••	•••	,, 301
acuminata, Heyne	,,	313	Theoastesii, A. DC			, 814
acuminata, Thw	,,	214	Tumbuggaia, W.	ŧΔ.	•••	,, 306
	••• ;	214	Wightii, A. DC			,, 314
canaliculata, Thw		215	Velaga globosa, Gae		.,.	ii. 575
combined Wight	*** 35	011	sylocarpa, Gertn.			i. 369
ceylanics, Wight	,		VENTILAGINEE			i. 680
cordifolia, Thw. lapsu Vo	# 2 0	8, 817	Ventilago, Gartn			i. 630
cordifolia	1, 00	-, J.1	, ,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	• •;		

Ventilago	Vol.	Page	Vernonia	1	Vol.	Page
bombaiensis, Dals	i.	681	abbreviata, DC		iii.	
bracteata, Wall	,,	631	acuminata, DC		,,	240
calyculata, Tulasne	"	681	albicans, DC		111. 23 4	£285
denticulata, Willd	,,	681	anceps, Clarke	•••	iii	. 233
leiocarpa, Benth	,,	631	Andersoni, Clarke		,,	211
macrantha, Tulasne	"	681	anthelmintics, Will	d.	,,	2 36
madraspatana, Gærts	,,	631	arborea, Ham	•••	,,	239
madraspatana, Benth	"	631	Arnottiana, Thoms.	•••	,,	238
madraspalana, Roxb	"	631	aspera, DC	•••	,,	233
Maingayi, Laws	"	631		•••	,.	234
silhetiana, Tulasne	"	631	aspera, Less	•••	••• ,,	234
Smithiana, Tulasne	"	631	attenuata, DC	:	,,	231
sulphurea, Tulasno	"	631			,,	231
sp., Griff	"	681	blanda, DC	•••	,,	241 241
Veratronia malayana, Miq.	VÍ.	391	blandula, Clarke	•••	17	239
Veratrum? malayanum, Jack		391	Blumeana, DC.	•••	,,	232
	246,	250 250	bracteolata, Wall.		6 ,,	2:20
Verbasoum, Linn	iv.	250	calycina, Wall	•••	,,	236
? Blattaria, Schm	"	250	Candolleana, W. S		,,	236
celsicides, Benth cuspidatum, Schrad	"	250	111 50		,,	239
: 52 307-11	"	250	celebica, DU chinensis, Less.	•••	,,	235
41	"	250	cinerascens, Sch.		,,	237
Mhamma Time	"	250	cinerea, Less	•••	,,	233
virgatum, With	"	250	clivorum, Hance		,,	282
Verbens, Linn	i♥.	565	conyzoides, DC	•••	,,	234
bonariensis, Linn		565	conyzoides, Thw.		,,	236
capitala, Forsk	"	563	convioles, Wight	•••	,,	236
hyderabadensis, Heyne	"	564	Cumingiana, Benth.		,,	241
indica, Linn	"	565	cuspidata, Buek.		,,,	240
jamaicensis, Linn		565	cyanonioides, Walp	•••	,,	234
nodistora, Linn		563	dindigulensis, DC.	•••	,,	236
officinalis, Linn	"	565	divergens, Benth.		,,	234
sororia, D. Don	"	566	elæagnifolia, DC .	•••	37	237
spuria, Linn		566	elliptica, DC		,,	287
Verbenacea, Nees	i₹.	495	erigeroides, DC	•••	,,	23 ŧ
Verbenacea, Wall	iv.	591	extensa, DC	•••	••• >>	238
VERBENACEÆ		660	fasciculata, Reinw.	•••	,,	234
VERBENEÆ		550	Gardneri, Thw.	•••	• • • • • • • • • • • • • • • • • • • •	230
Verbesina Acmella, Lion	ıii.	307	Gardneri, Thw	•••	*** 33	231
alba, Linn	"	804	Helferi, Hk. f	•••	,,	231
biflora, Linn		306	Hookeriana, Arn.	••	,,	235 238
? biflora, Roxb		307	indica, Clarke	•••	,,	239
	306,		javanica, DC	•••	,,	231
Bosvallia, Linn. f		308 308	juncea. Kurz	•••	,,	232
Boswellia, Roxb		808	Kingii, Clarke Kurzii, Clarke	•••	,,	240
calendulacea, Linn			laziflora, Less	•••	••• ;;	234
	305	243		•••	',,	284
Lavenia, Linn Lavenia, Roxb		305	linifolia, Reinw.	•••	,,	281
. 1'A T		308	Lobbii, Hk. f	•••	,,	281
		304	lobelioides, Wall.		,,	888
Pseudo-acmella, Linn		807	longicaulis, DO.	•••	"	235
sativa, Roxb		308	malabarica, Hk. f.		"	280
scaborrima, Wall, lapsu	"		Metziana, Schults	•••	,,	284
Wedelia	iii.	807	monosis, DC		,,	289
Vernonia, Schreb		229	montana, Edgew.	•••	,,	284
		-	,		••	

Vernonia)			Veronica			_
		Page	2000 177-11			Page
madfalt amount of Miles			cana, Wall	• • • • • • • • • • • • • • • • • • • •	īv.	295
neilgheryensis, Thw	. ,,	285	onpitata, Benth	• •••	"	295
nemoralis, Thu	• ,,	287	cardiocarpa, Walp	• •••	. ,,	295
nilgheryensis, DC	. ,,	234	ciliata, Fisch		"	292
olijocephala, Edgew	. ,,	233	deltigera, Wall		"	292
Parishii, Hk. f	. ,,	240	elbrusensis Boiss		"	295
parviflora, Reinw		234	grandiflora, Wall		"	292
pectiniformis, DC	•••	239	Griffithii, Benth		"	295
peguensis, Clarks	•••	232	hederæfolia, Linn		"	294
peninsularis, Clarke	•••	283	himalanda n n		•••	292
mlarantifation DO	•	234	1 - 2		"	296
marin addard and a DO		239			**	292
		240			"	298
punduana, DC			lanuginosa, Benth		"	
revoluta, Ham		233	laxa, Benth		"	295
rhomboidea, Edgew	. ,,	234	Lindleyana, Wall		"	290
rigiophylla, DC	. ,,	230	? macrostemon, Bung		"	292
riparja, Wall	,,	230	Maddeni, Edgew		13	2 96
. Roxburghii, Less	. ,,	232	microtheca, Boiss. &	Bal.	"	295
saligna, DC	. ,,	235	oxycarpa, Boiss		,,	293
salvimfolia, Wight	. ,,	237	persica, Poir		,,	294
scandens, DC		241	polita, Fries		"	294
scariosa, Arn		236	punctata, Ham		"	298
		235	pusilla, Benth			293
- 1 - 10 it To . 41	-	240	rupestris, Airch. & H		"	292
		237	scrophularioide , Wall		"	2.15
					"	296
squarrosa, Less	. ,,	230	serpyllifolia, Linn		"	295
subsessilis, DC	• ••	230	Thunbergii, A. Gray	•••	"	
talaumifolia, Hk. f. & T.	"	240	? thyrsiflora, Wall	• •••	"	254
teres, Wall	. ,,	229	undulata, Wall	• •••	**	298
Thomsoni, Hk. f	. ,,	232	verna, Lina	• •••	,,	296
Thwaitesii, Clarke	22.	281	sp., Griff	• •••	"	293
travancorica, Hk. f	, ,,	240	Veticeria, Hack		vii.	186
vagans, DO		241	arundinacea, Griseb.	•••	,,	186
volkameriæfolis, DC		240	muricata, Griseb		"	186
volkameriæfolia, Bedd	•••	240	odorata, Virey		,,	186
volkameriæfolia, Steetz, vide			Viburnum, Linn		iii.	3
punduana		240	acuminatum, DC		,,	5
vulgaris, Steetz, vide pun-			acuminatum, Wall		"	5
		240	atro-cyaneum, Clarke		"	7
dyana	•••	238	capitellatum, Wight		•••	6
Wightiana, Arn			Colebrookianum, Wal	ı	"	5
Wightiana, Wall	•••	271	cordifolium, Wall		"	6
meylanica, Less	• ,,	238			"	_
Zollingeriana, Sch	,,,	234	coriaceum, Bl	_	"	5
Vernoniacea, Griff			corylifulium, Hk. f. &		"	3
Vernonieæ iii	. 220,		outinifolium, D. Don	•••	"	8
$f Veronica, \it Linn. \ldots \ldots \ldots$	iv.	291	cylindricum, Ham	•	"	9
agrestis, Linn	. ,,	294	erubescens, Wall	•••	"	7
Anagallis, Linn		293	fœtens, Dene		"	8
argute-serrata, Regel &			fætidum, Wall	• • • •	"	4
Schmalk		295	/		"	6
arvensis, Linn	•••	296	grandiflorum, Wall		"	8
		295	Griffithianum, Clarke	•••	"	4
bartsiæfolia, Boiss	••	298	hebanthum, W. & A.		"	ē
Beccabunga, Linn		294	hebanthum, Thw			ĕ
biloba, Linn			interesimen Well		"	5
Brunoniana, Wall	"	291	integers imum, Wall.	•••	"	4
Busbaumii, Ten	"	294	involucratum, Wall	- m	"	4
campylopoda, Boiss	. ,,	294	involucratum, Hk. f. d	, ı.	"	79

Lonkana, Linn. iii. 3 brachycarpa, Kurs ii. 306 lutescens, Bl.	Vibarpam ,	T	Zol.	Page	Vigna .	. /		Vol.	Page
lantamoides, Micht							•••	· ii.	206
Lutsecens, Bl.				6	carinalis, Benth.	•••			800
Mullaha, Ham.				5					
Mulloha, Ham.	lutescens, Hk. f. & T.			5					
nervosum, D. Don	Mullaha, Ham.			4.					205
odoratissimum, Ker. " 7 polycarpum, Wall. " 3 premnacaum, Wall. " 4 pubigerum, W. & A. " 7 punctatum, Ham. " 5 sambucinum, Reinw. iii. 6, 671 sambucinum, Reinw. iii. 7 stellulatum, Wall. " 4 Wightianum, Hb. Hohen. " 5 Wightianum, Hb. Hohen. " 6 Wightianum, Wall. " 7 seylanicum, Gardn. " 6 wightianum, Wall. " 7 seylanicum, Gardn. " 6 divulsa, Rehb. " 703 vincarya evistata, Wall. " 11 Vicarya evistata, Wall. " 17 vicarya evistata, Wall. " 17 yiostia, DC. " 671 millefolia, Clarke " 671 plicolia, Linn. " 672 plicolia, Linn. " 673 plicolia, Linn. " 674 plicolia, Linn. " 675 plicolia, Linn. " 676 plicolia, Linn. " 677 plicolia, Linn. " 677 plicolia, Linn. " 678 plicolia, Linn. " 679 plicolia, Roble. " 6				8					207
pobycarpum, Wall.			•••					•••	
premnaceum, Wall							-	•••	
pubigerum, W. & A									
punctatum, Ham									
Sambucinum, Reinw. iv. 681 Simensis, Endl. 905 Simensis, Hk. f. f. T. iii. 7 stellulatum, Wall. 94 wilhamum, Hb. Hohen 75 Wightianum, Wall. 97 Seylanicum, Gardn. 96 canescens, Endb. 906 wightianum, Wall. 97 seylanicum, Gardn. 96 canescens, Echb. 906	nunotetum Ham	-							
Simonsii, Hk f. f. T.	eambroinum Reine			1					
Simonsii, Hk. f. & T.	eamhucinum Rainw		iv,	181	sinensis Endl				
Stellulatum, Wall.									
Wightianum, Hb. Hohen. 5 Wightianum, Wall. 7 Yoner, Beauv. vi. 700 seylanicum, Gardn. 6 canescens, Rohb. 700 sp., Griff. 4, 7 divulsa, Rchb. 703 sp., Wall. 1 1 murcata, Rchb. 700 Vicarya cristata, Wall. iv. 11 murcata, Rchb. 700 vicarya cristata, Wall. iv. 11 murcata, Rchb. 700 millefolia, Clarke 671 wicia, Rchb. 706 millefolia, Clarke 671 vifa arabica, Steud. vii. 252 P Stewartii, Clarke 671 vifa arabica, Steud. vii. 252 Yicia, Linn. ii. 176 capullaris, Robb. 701 Vicia, Linn. ii. 176 capullaris, W. & A. 248 adropurpura, Deav. ii. 178 capillaris, W. & A. 248 abenghalonsis, Linn. ii. 179 commutata, Trin. 253 benghalonsis, Linn. ii. 179 commutata, Trin. 253 Griffithii, Baker ii. 178 diandra, Trin. <t< td=""><td></td><td>•••</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		•••							
Wightianum, Wall.		•••					-		
Seylanicum, Gardn		•							
### ### ### ### ### ### ### ### ### ##		••							
## ## ## ## ## ## ## ## ## ## ## ## ##	A-180								
Vicarya cristata, Wall. iv. 11 muricata, Rohb. 703 Vicatia, DC. ii. 670 remota, Rohb. 703 coniifolia, DC. ii. 670 remota, Rohb. 701 millefolia, Clarke 671 vienchila, Rohb. 701 Vicia, Linn. ii. 176 capensis, Beauv. 248 angustifolia, Roth 178 capillaria, W. & A. 248 atropurpurea, Desv. 179 ciliata, Presl 248 atropurpurea, Desv. 178 capensis, Beauv. 248 atropurpurea, Desv. 179 ciliata, Presl 248 atropurpurea, Desv. 178 capillaria, W. & A. 248 atropurpurea, Desv. 179 ciliata, Presl 248 atropurpurea, Desv. 178 capillara, Beauv. 248 atropurpurea, Desv. 178 capillara, Resuv. 248 dendhensis, Linn. 177 diandra, Trin. 251 dumetorum, Benth. 178 diandra, Wight 247 fabs., Linn. 177 discoe			" ,						
Vicatis, DC ii. 670 remota, Rohb 706 coniifolia, DC 671 stenophylla, Rohb 701 millefolia, Clarke 671 vita arabica, Steud 71 ? Stewartii, Clarke 671 barbata, Beauv 248 vicia, Linn ii. 176 capensis, Beauv 248 angustifolia, Both 178 capensis, Beauv 248 atropurpureà, Desv 178 capillaria, W. & A 248 atropurpureà, Desv 178 commutata; Trin 250 benghalensis, Linn 179 commutata; Trin 253 Cracca, Benth 177 diandra, Trin 253 dumetorum, Benth 178 diandra, Trin 253 dumetorum, Benth 179 discoepora, Trin 253 Griffithii, Baker 178 discoepora, Trin 248 hirsuta, Koch 177 erota, Trin 247 replida, Jacquem		,		• •				"	
Coniifolia, DC								••	
millefolia, Clarke		•••.	11.					"	
Stewartii, Clarke		•••	77						
Vicia, Linn. ii. 176 capensis, Beauv. 248 angustifolia, Roth 178 capillaris, W. & A. 248 atropurpured, Desv. 179 ciliata, Presl. 251 Bobartii, Forst. 178 commutata; Trin. 253 benghalensis, Linn. 177 coromandellana, Beauv. 253 Cracca, Benth. 177 diandra, Trin. 251 dumstorum, Benth. 178 diandra, Wight 247 Faba, Linn. 178 discoepora, Trin. 255 Griffithii, Baker 178 discoepora, Trin. 248 hirsuta, Koch 177 erosa, Trin. 248 hirsuta, Koch 177 erosa, Trin. 247 malis, Benth. 179 geniculata, Nees 250 pallida, Turcs. 178 glaucifolia, Stend. 250 pallida, Jacquem. 178 indica, Trin. 248 rigidula, Royle. 178 indica, Trin. 248 sativa, Linn. 178 inttoralis, Beauv. 249		•••	,,				•••	711.	
angustifolia, Roth		•••	??				•••	97	
atropurpured, Desv. "179 cillata, Presl "251 Bobartii, Forst "178 commutata; Trin "258 benghalensis, Linn "179 coromandellana, Beauv "253 Cracca, Benth "177 diandra, Trin "251 dumetorum, Benth "178 diandra, Wight "247 Faba, Linn "179 discospora, Trin "258 Griffithii, Baker "178 elongata, Beauv "248 hirsuta, Koch "177 erosa, Trin "248 narbonensis, Linn "179 geniculata, Nees "247 mollis, Benth "179 geniculata; Nees "250 pallida, Turcs "178 glaucifolia, Steud "250 pallida, Turcs "178 jlaucifolia, Steud "250 pallida, Jacquem "178 ioclados, Nees "249 sativa, Linn "178 indica, Trin "248 sepium, Linn "178 mangalorica, Hochst "248 sepium, Linn "179 minutifora, Trin "248 sylvatica, Benth "179 orientalis, Nees "249 tenera, Grah "177 orientalis, Nees "251 tenuifolia, Roth "177 orientalis, Wight vii. 349, 250 tetrasperma, Manch "177 pallida, Nees "251 vicoa, Cass		•••	11,.			•••	•••	79 .	
Bobartii, Forst.		•••	"				4.00	99 -	
benghalensis, Linn. " 179 coromandeliana, Beauv. " 253 Cracca, Benth. " 177 diandra, Trin. " 251 dumetorum, Benth. " 178 diandra, Wight " 247 Faba, Linn. " 179 discopora, Trin. " 248 hirsuta, Koch " 177 elongata, Beauv. " 248 hirsuta, Koch " 177 erosa, Trin. " 247 mollis, Benth. " 179 geniculata, Nees " 250 pallida, Turcs. " 178 jaucifolia, Stend. " 250 pallida, Jacquem. " 178 indica, Trin. " 248 peregrina, Linn. " 178 icidade, Nees " 249 rigidula, Royle " 178 littoralis, Beauv. " 249 sativa, Linn. " 178 minutifora, Trin. " 248 sepium, Linn. " 178 minutifora, Trin. " 248 sylvatica, Benth. " 179 minutifora, Trin. " 248 sylvatica, Benth. " 177 orientalis, Nees " 251 Vicira " 177 <t< td=""><td></td><td>•••</td><td>,,</td><td></td><td></td><td></td><td>•••</td><td>"</td><td></td></t<>		•••	,,				•••	"	
Cracca, Benth. , 177 diandra, Trin. , 251 dumetorum, Benth. , 178 diandra, Wight , 247 Faba, Linn. , 179 discospora, Trin. , 253 Griffithii, Baker , 178 elongata, Beauv. , 248 hirsuta, Koch , 177 erosa, Trin. , 248 mollis, Benth. , 177 exilis, Trin. , 248 narbonensis, Linn. , 179 geniculata, Nees , 250 pallida, Jacquem. , 178 indica, Trin. , 248 peregrina, Linn. , 178 indica, Trin. , 249 rigidula, Royle , 178 ittoralis, Beauv. , 249 sativa, Linn. , 178 mangalorica, Hochst. , 248 sepium, Linn. , 178 minutifora, Trin. , 248 sylvatica, Benth. , 178 murina. Sieb. , 249 tennar, Grah. , 177 orientalis, Nees , 251 tetrasperma, Manch , 177 pallida, Nees vii. 262 Vicoa, Cass. iii. 297 pulchella, Trin. , 253 auriculata, Cass. , 297		•••	"					29	
dumetorum, Benth. , 178 diandra, Wight , 247 Faba, Linn. , 179 discospora, Trin. , 258 Griffithii, Baker , 178 elongata, Beauv. , 248 hirsuta, Koch , 177 erosa, Trin. , 247 mollis, Benth. , 177 eroilis, Trin. , 248 narbonensis, Linn. , 179 geniculata, Nees , 250 pallida, Jacquem. , 178 indica, Trin. , 248 pergrina, Linn. , 178 ioclados, Nees , 249 rigidula, Royle , 178 littoralis, Beauv. , 249 sativa, Linn. , 178 mangalorica, Hochst. , 248 sepium, Linn. , 178 murina, Sieb. , 248 sylvatica, Benth. , 177 orientalis, Nees , 251 tenera, Grah. , 177 orientalis, Wight vii. 249 tetrasperma, Manch , 177 pallida, Nees vii. 252 Vicinz ii. 58 pilifera, Trin. , 251 vicasc iii. 297 pulchella, Trin. , 253 auriculata, Cass. , 297		•••	"					"	
Faba, Linn.		•••	"					23	
Griffithii, Baker		•••	"			•••	•••	23	
hirsuts, Koch, 177 mollis, Benth, 177 mollis, Benth, 179 pallida, Turcs, 178 pallida, Jacquem, 178 peregrins, Linn, 178 rigidula, Royle, 178 sativa, Linn, 178 sepium, Linn, 179 minutiflora, Trin, 248 sepium, Linn, 179 sericulata, Beauv, 249 littoralis, Beauv, 249 setiva, Linn, 179 minutiflora, Trin, 248 sepium, Linn, 179 minutiflora, Trin, 248 sepium, Linn, 179 rovientalis, Nees, 251 tenuifolis, Roth, 177 voientalis, Wight vii. 249, 250. retrasperma, Mænch, 177 voientalis, Wight vii. 249, 250. pallida, Nees, 251 viica, Cass, 110 sepium, Linn, 251 rovientalis, Vight vii. 249, 250. pallida, Nees, 251 rovientalis, Cass, 297 sepium, Trin, 253 aurita, DC, 297 sepium, Dals, 297 repsiris, Steud, 247 rigidifolia, Trin, 253 rupestris, Trin, 248 rupestris, Trin, 248 rupestris, Trin, 248 rupestris, Trin, 249 rupestris, Trin, 249 rupestris, Trin, 248 rupestris, Trin, 248 rupestris, Trin, 249 rupestris, Trin, 249 rupestris, Trin, 249 rupestris, Trin, 248 rupestris, Trin, 248 rupestris, Trin, 249 rupestris, Trin, 248 rupe		•••	"		discospora, Trin.			37	
mollis, Benth. ", 177 ewilis, Trin. ", 248 narbonensis, Linn. ", 179 geniculata, Nees ", 250 pallida, Turcs. ", 178 glaucifolia, Steud. ", 250 pallida, Jacquem. ", 178 indica, Trin. ", 248 rigidula, Royle ", 178 icclados, Nees ", 249 rigidula, Royle ", 178 littoralis, Beauv. ", 249 sativa, Linn. ", 178 mangalorica, Hochst. ", 248 sepium, Linn. ", 179 minutifora, Trin. ", 248 sylvatica, Benth. ", 179 minutifora, Trin. ", 248 sylvatica, Benth. ", 179 orientalis, Nees ", 261 tenuifolia, Roth ", 177 orientalis, Wight vii. 349, 250 tetrasperma, Manch ", 177 pallida, Nees vii. 262 VICIEZ ", 115 Spilifera, Trin. ", 255 Vicoa, Cass. ", 297 pulchella, Trin. ", 255 aurita, DC. ", 297 Rosburghian, Nees ", 253 aurita, DC. ", 297 Rosburghian, Nees ", 253 indica, DC. ", 297 rupestris, Trin. ", 248 vestita, Benth. ", 297 scabrifolia, Hochst. ", 250 Vigna, Saoi ", 205		•••	"					"	
narbonensis, Linn		•••	"		erosa, Irin				
pallida, Turcs. "178 glaucifolia, Steud. "250 pallida, Jacquem. "178 indica, Trin. "248 peregrina, Linn. "178 ioclados, Nees. "249 rigidula, Royle "178 littoralis, Beauv. "249 sativa, Linn. "178 mangalorica, Hochst. "248 sepium, Linn. "179 minutifora, Trin. "248 sylvatica, Benth. "177 orientalis, Nees. "251 teners, Grah. "177 orientalis, Wight. vii. 249, 250 tetrasperma, Manch. "177 pallida, Nees. vii. 253 VICIRE. "10 58 pllifera, Trin. "251 VICIRE. "10 58 pllifera, Trin. "252 appendiculata, DC. "297 Retsii, Steud. "247 auriculata, Cass. "297 Retsii, Steud. "247 aurita, DC. "297 Rosburghia, Nees. "253 cernus, Dals. "297 Rosburghii, Nees. "253 rindica, DC. "297 rupestria, Trin. "253 rindica, DC. "2		•••	"		extus, irin			"	
pallida, Jacquem. "178 indica, Trin. "248 peregrina, Linn. "178 ioclados, Nees. "249 rigidula, Royle. "178 littoralis, Beauv. "249 sativa, Linn. "178 mangalorica, Hochst. "248 sepium, Linn. "179 minutifora, Trin. "248 sepium, Linn. "178 murina, Sieb. "249 tenera, Grah. "177 orientalis, Nees. "251 tenuifolia, Roth. "177 orientalis, Wight. vii. 249, 250. tetrasperma, Manch. "177 pallida, Nees. vii. 252 VICIRE. "ii. 58 pilifera, Trin. "251 vicoa, Cass. "iii. 297 pulchella, Trin. "252 appendiculata, DC. "297 Retsii, Steud. "247 rigidifolia, Trin. "253 aurita, DC. "297 Rosburghiana, Nees. "253 cernus, Dals. "297 Rosburghii, Nees. "253 rindica, DC. "297 Rosburghii, Nees. "253 rindica, DC. "297 scabrifolia, Hochst. "248 <t< td=""><td></td><td>•••</td><td>,,</td><td></td><td></td><td></td><td></td><td>"</td><td></td></t<>		•••	,,					"	
peregrins, Linn. "178 ioclados, Nees "249 rigidula, Royle "178 littoralis, Beauv. 249 sativa, Linn. "178 mangalorica, Hochst. "248 sepium, Linn. "179 minutiflora, Trin. "248 sylvatica, Benth. "177 orientalis, Nees "251 tenuifolia, Roth "177 orientalis, Nees "251 tenuifolia, Roth "177 pallida, Nees vii. 252 VICIRE "ii. 58 pilifera, Trin. "252 appendiculata, DC. "297 Ressii, Steud. "247 auriculata, Cass. "297 rigidifolia, Trin. "253 aurita, DC. "297 Rosburghiana, Nees "253 cernus, Dals. "297 Rosburghiana, Nees "253 indica, DC. "297 Rosburghia, Nees "253 indica, DC. "297 Rosburghia, Nees "253 indica, DC. "297 Rosburghia, Nees "253 rupestris, Trin. "248 vestita, Benth. "297 scabrifolia, Hochst. "250 Vigna, Saoi "11204 setulosa, Trin. "248	pailida, Turcs	•••	**						
rigidula, Royle , 178 sativa, Linn , 178 sepium, Linn , 179 sylvatica, Benth , 177 tenuifolia, Roth , 177 vertrasperma, Manch , 177 vicina , 177		•••	"					**	
sativa, Linn. "178 mangalorica, Hochst. "248 sepium, Linn. "179 minutifora, Trin. "248 sylvatica, Benth. "178 minutifora, Trin. "249 tenera, Grah. "177 orientalis, Nees. "251 tenuifolia, Roth. "177 pallida, Nees. vii. 249, 250 tetrasperma, Manch. "177 pallida, Nees. vii. 253 Vicira. "10 58 pllifera, Trin. "251 Vicora. "10 297 Retsii, Steud. "252 appendiculata, DC. "297 Retsii, Steud. "247 aurita, DC. "297 Resuburghian, Nees. "253 aurita, DC. "297 Rosburghia, Nees. "253 cernua, Dals. "297 Rosburghia, Nees. "253 redict, DC. "297 rupestria, Trin. "253 vestita, Benth. "297 scabrifolia, Hochst. "250 Vigna, Saoi. "10 204 setulosa, Trin. "250 Satulosa, Trin. "250 *251 Satulosa, Trin. "250		•••	"						
sepium, Linn. " 179 minitylora, Trin. " 249 sylvatica, Benth. " 178 murina. Sieb. " 249 tenera, Grah. " 177 orientalis, Nees " 251 tenuifolia, Roth " 177 pallida, Nees vii. 249, 250 tetrasperma, Manch " 177 pallida, Nees vii. 252 Vicina. " ii. 58 pilifera, Trin. " 251 Vicina. " 297 pulchella, Trin. " 252 appendiculata, DC. " 297 Retsi, Steud. " 247 aurita, DC. " 297 Rosburghiana, Nees " 253 cernus, Dals. " 297 Rosburghiana, Nees " 253 rindica, DC. " 297 rupestris, Trin. " 253 vestita, Benth. " 297 scabrifolia, Hochst. " 250 Vigna, Saoi " ii. 204 setulosa, Trin. " 250	rigidula, koyle	•••	"					"	
sylvatica, Benth. 178 murina, Sieb. 249 tenera, Grah. 177 orientalis, Nees. 251 tenuifolia, Roth. 177 orientalis, Wight. vii. 249, 250 tetrasperma, Manch. 177 pallida, Nees. vii. 252 Vicua. ii. 58 plifera, Trin. 251 Vicoa, Cass. iii. 297 pulchella, Trin. 252 appendiculata, Oc. 297 Retsii, Steud. 247 auriculata, Cass. 297 Rosburghiana, Nees. 253 cernua, Dals. 297 Rosburghiana, Nees. 253 indica, DC. 297 Rosburghia, Nees. 253 rupestris, Trin. 248 vestita, Benth. 297 scabrifolia, Hochst. 250 Vigna, Savi iii. 204 setulosa, Trin. 283 Post Paccentalis, Nees. 250 setulosa, Trin. 286 terrasperma, Manch. 297 setulosa, Trin. 286 setulosa, Trin. 287 setulosa, Trin. 288	sativa, Linn		77						
tenera, Grah , 177 orientalis, Nees , 251 tenuifolia, Roth , 177 orientalis, Wight vii. 349, 250. tetrasperma, Mænch , 177 pallda, Nees vii. 252 VICIRE ii. 58 pilifera, Trin , 251 Vicoa, Cass iii. 297 pulchella, Trin , 251 appendiculata, DC , 297 Retsii, Steud , 247 auriculata, Cass , 297 regidifolia, Trin , 253 aurita, DC , 297 Rosburghiana, Nees , 253 indica, DC , 297 rupestris, Trin , 253 indica, DC , 297 rupestris, Trin , 248 vestita, Benth , 297 scabrifolia, Hochst , 250 Vigna, Saoi ii. 204 setulosa, Trin , 236			"						
tennifolia, Roth, 177 orientalis, Wight, 250, 250, tetrasperma, Manch, 177 pallida, Nees, vii. 252 ylifera, Trin, 251 Yicoa, Cass	A		"					97	
tetrasperma, Manch, 177 VICIRE ii. 58 Pilifera, Trin, 251 Vicoa, Cass iii. 297 auriculata, DC, 297 auriculata, Cass, 297 aurita, DC, 297 cernus, Dals, 297 rigidifolia, Trin, 253 cernus, Dals, 297 rigidifolia, Trin, 253 cernus, Dals, 297 rigidifolia, Trin, 253 rindica, DC, 297 restita, Benth, 297 vestita, Benth, 297 Vigna, Savi iii. 204 vestilosa, Trin, 250 vii. 252 vii. 252 vii. 253 vii. 254 rigidifolia, Trin, 253 rupestris, Trin, 253 scabrifolia, Hochst, 250 vii. 253 vii. 254 vii. 255 vii.			"				-::	940	
VICIRE ii. 58 pilifera, Trin. " 251 Vicoa, Cass. iii. 297 pulchella, Trin. " 252 appendiculata, DC. " 297 Retsii, Stend. " 247 auriculata, Cass. " 297 rigidifolta, Trin. " 253 aurita, DC. " 297 Rosburghiana, Nées " 253 cernus, Dals. " 297 Rosburghia, Nées " 253 indica, DC. " 297 rupestris, Trin. " 248 vestita, Benth. " 297 scabrifolia, Hochst. " 250 Vigna, Savi ii. 204 setulosa, Trin. " 336 Penn " 297 Penn " 297		•••	"						
Viooa, Cass. iii. 297 pulchella, Trin. " 252 appendiculata, DC. " 297 Retsii, Steud. " 247 auriculata, Cass. " 297 rigidifolia, Trin. " 253 aurita, DC. " 297 Rosburghiana, Nées " 253 cernus, Dals. " 297 Rosburghii, Nees " 253 indica, DC. " 297 rupestris, Trin. " 248 vestita, Benth. " 297 scabrifolia, Hochst. " 250 Vigna, Savi ii. 204 setulosa, Trin. " 336 Port — 250 — 250 Setulosa, Trin. " 236 Pennantia " 250 — 250 Port — 250 — 251 Port — 252 — 253 Port — 252 — 253 Port — 252 — 253 </td <td>Verrasperma, Monch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Verrasperma, Monch								
appendiculata, DC. " 297 Retsii, Steud. " 247 auriculata, Cass. " 297 rigidifolia, Trin. " 253 aurita, DC. " 297 Rosburghian, Nees " 253 cernus, Dals. " 297 Rosburghian, Nees " 253 rindica, DC. " 297 rupestris, Trin. " 253 vestita, Benth. " 297 scabrifolia, Hochst. " 250 Vigna, Savi " 204 setulosa, Trin. " 236	Vicina Care								
auriculata, Cass, 297 rigidifolia, Trin, 253 aurita, DC, 297 Rozburghiana, Nées, 253 cernus, Dals, 297 Rozburghii, Nees, 253 indica, DC, 297 vestita, Benth, 297 Vigna, Savi, 11. 204 setulosa, Trin, 250 Setulosa, Trin, 250 Setulosa, Trin, 250	annendiculata DC								
aurita, DC. ", 297 Rosburghiana, Ness. ", 253 cernus, Dals. ", 297 Rosburghii, Ness. ", 253 indica, DC. ", 297 rupestris, Trin. ", 248 vestita, Benth. ", 297 scabrifolia, Hochst. ", 250 Vigna, Savi ", 204 setulosa, Trin. ", 236 Pope ", 250 ", 250 Setulosa, Trin. ", 236 Setulosa, Trin. ", 236									
cernus, Dals. ", 297 Rosbusghti, Ness. ", 253 indica, DO. ", 297 rupestris, Trin. ", 248 vestita, Benth. ", 297 scabrifolia, Hochst. ", 250 Vigna, Savi "ii. 204 setulosa, Trin. ", 236 Permanentary ", 250 ", 250 Setulosa, Trin. ", 236 ", 250 Setulosa, Trin. ", 248 ", 250 Setulosa, Trin. ", 236 ", 250 Setulosa, Trin. ", 248 ", 250 Setulosa, Trin. ", 250 ", 250 Setulosa, Trin									
indica, DO.									
Vestita, Benth.									
Vigna, Savi ii. 204 setulosa, Trin , 236			>> .						
	970 ~ .		??						
unormana, italy)) 200 (oproduct Donut)) 202		•••							
	wieniemen, it sih	•••	"		Shared Donate	•••	•••	77	

Vilfa	7	7ol. Page	Viole		Vo	. Page
tenacissima, H. B. K.	'	vii. 248	Notoniana, Wall.		ີ ລັ	
tenuissima, Schult	•••	" 248	odorata, Linn		,,	184
tremula, Trin	•••	,, 250	? palmaris, Buch.		,,	184
virginica, Beauv	•••	" 249	Patrinii, DC		"	183
vulyaris, Wight	.,.	,, 258	pilosa, Bl		. ,,	184
sp., Str. & Wint,		311	primulifolia, Linn.		•• ,,	188
Villarsia cristata, Spreng.		v. 131	reniformis, Wall. Royleana, Wall. serpens, Wall		•• ,,	188
eglandulosa, Griff		,, 182	Rouleana Wall			184
indica, Vent indica, Wall		" 182	serpens. Wall.			184
indica, Wall	•••	" 181	serpens, Wall			184
macrophylla, Wight	•••	" 182	suffruticosa, Roxb.		,,	185
nymphæordes, Vent.	•••	,, 181	sylvatica, Fries			186
parvifolia, Wall	•••	″ 1ua	tenuis, Benth			188
Villebrunes, Gaud		y. 589	tricolor, Linn	••• ••		182
ammanidian lata Wadd		590	Walkerii, Wight		•	188
Juntanana Di	•••	" KOO	Wallichiana, Ging.		•••	188
intermifolic Coul		" EOU	Wichtiana Wall		••	184
40.70.m47.m D1		. 590	Wightiana, Wall. Wightiana, Wight		.,	184
Allenge Time	i	ii. 64 0	17		?"	182
Gulielmi Waldemarii, Kl	·	640	VIOLACEA			182
mawidana Data		" 240	Violes	•••	2 2 2	
mm of 11 a 14		" 040	Virana, Jones	••• ••		462
		" 040		•••		
Vincetoxicum Arnottianu	•••	,, 640	celebica, Bl	•••	. ,,	468
	٠.	v. 22	javanica, Bl	•••	•••	468
concesso Done			tubiflora, Bl	•••	22	468
L	•••	, 22			11.	261
` 1 O 1	••• - 1	, 22		•••		251
luridum, Stocks	•••	,, 22			. v.	228
		22, 40		•••	"	223
Wale Time	•	v. 22		•••		223
	i			••• . •••		224
		, 185	articulatum, Burm.			226
apetala, Roxb	,		articulatum, Brand.	•••	* **	226
1. Jal T	,		articulatum, Miq.	•••	"	226
biflora, Linn	,		attenuatum, DO.	•••	,,	226
	,		attenuatum, Hohen.		• • • • • • • • • • • • • • • • • • • •	225
conescens, Wall	,			•••	"	224
	,				**	223
chinensis, G. Don,	•• ,			•••	"	226
cinerea, Boiss	•• ,			•••	**	224
	•• ••		dichotomum, D. Don	• • • •	**	226
	•• ,		elongatum, Wall	•• •••	**	226
	•• •		jaicatum, weii	•••	"	284
dubia, Wall	,		floccosum, Thw.	••• ••••	,,	227
	,		foliatum (error fo	r fal-		
	,			•••	,,	224
	,1			•• •••	"	226
	•• ••			•• •••	"	227
	•• ,,		Helferi, Proul	••. •••		228
	,		Pheteranthum, Wall.	. ▼.	227,	
? Hamiltoniana, D. Don	,				▼.	224
	,,	184			"	224
Hookeri, Thoms	,,				"	226
kunawarensis, Royle	,,			v.	227,	288
Metsiana, Hohen	,,				٧.	225
mysorensis, Wall	,,		moniliforme, Bl		"	226
nilagirica, Turcz		194	monilijorme, Wight	•••	27	226
* *	•	:	-			

			` •
Viscum	Val	Paga	Vitex / Vol. Page
mosoicum, Roah	₹.	224	heterophylla, Roxb iv. 595
		224	1 - 4 11 - 17 EOE
	. >>		heterophylla, Kurz " 585
nepalense, Spreug	,,	226	heterophylla, Schuu ,. 585
obtusa/um, Wall	"	225	inæquifolia, Turez ,, 585
Opuntia, Thunb	,,	226	incisa, Lamk ,, 584
opuntioides, Rozb	,,	226	incisa, Wall ,, 583
orbiculatum, Wight		244	involucratus, Piesi " 601
	?"	224	landar Time I FOR
	"	225	1
ovalifolium, Wall	937		11 11 19 11 11 11 11 11 11 11 11 11 11 1
pla'yphyllum, Spreng. v.	227,		limonifolia, Wall ,, 584
, ramosissimum, Wail	v.	225	Loureirii, Wight ,, 585
ramosissimum, Wall	,,	225	macrophylla, Br ,, 187
spathulifolium, Thw	"	228	Negundo, Linn ,, 583
stellatum, D. Don	"	223	ovata, Thunb ,, 583
tænioides, Comm		226	001 (100) (100)
verruculosum, W. & A	"	224	mamiaulata Tamba " KOA
	17	225	
verticillatum, Rottl	"		
verticillatum, Roxb	"	224	pubescens, Fahl ,, 585
Wallichianum, W. & A.	,,	227	repens, Blanco ,, 583
Wightianum, W. & A	,,	227	saligna, Roxb " 587
Wightianum, W. & A Wightianum, Wall	"	226	scabra, Wall 588
sp. Griff		226	non-dontata Wall KU7
Visenia concatena a, Spreug.	i.	374	simpliciflm Clarks #96
		374	numatuana Min Koc
corchorifolia, Spreng	"		
supina, Spreng	"	374	trifolia, Linn. f , 583
tomentosa, Miq	"	374	undulata, Wall ,, 585
umbellata, Wight	,,	374	urreolain, Clarke ,, 585
Visiania, DC	iii.	617	vestita, Wall " 587
grindylora, DC	"	617	Wimberleyi, Kurz " 586
robusta, DC		614	seylanica, Turcz ,, 584
14 337:1.4	"	615	sp., Hk. f. & T. iv. 585 586 587, F88
roousta, Wight	"	614	
sumatrana, Miq	"	7.7.7	? Viticastrum racemosum, Presl iv. 601
Kisiania, Gasp	₹.	508	VITICEE iv. 561
elastica, Gasp	,,	508	Vitie, Linn i. 615
Vismia? arlorescens, Chois.	i.	258	aduats, Wall ,, 649
Viter, Linn	JV.	£83 1	anamailayana, Bedd ,, 656
Agnus castus, Kurz	,,	583	angustifolis, Wall ,, 654
alata, Heyne		584	anamana Dala ta Ciha Cil
1 / 'D ')	. **	587	agantaina Laura 240
	"	584	annimilia Vara 600
	"		
altissima, Linn. f	"	584	atroviridis, Wall " 663
altissima, Thw	٠,	584	auriculata, Laws ,, 658
uppendiculata, Rottl	32	584	barbata, Wall ,, 651
arourea, Desf	,,	583	bracteolata, Wull ,, 654
arborea, Roxb	,,	585	campylocarpa, Kurs , 657
? avillaris, Wall		588	concuencia Dala
1 1 1 107.11.1	"	583	contonionaia Com CCO
2 2	"	588	annealate M Dan " 450
bombacifolia, Wall	**		,, out
Chue SCens, Kurz	"	586	carnosa, Wall ,, 654
canescens, Wall	,,	586	oinnamomea, Wall ,, 659
coriaces, Clarke	,.	586	cinnamomea, Wall 1. 650, 659
Cunninghamii, Sobuu	"	588	compositifolis, Laics 1. 659
diversifolia, Kurz	",	585	coralloides, Hk. f ,, 659
Wall managed and Wall		587	andifolia Doch Q11
	"	588	? costata, Wall 647
gamosepala, Griff	"	588	manufacturall OFA
glabrata, Br	"		different Win ,, 002
Haynga, Rozb	"	588	diffass, Miq ,, 646

Vitis .		V ol	Page	· Vitis			₩al	Page
discolor, Dals		i.	647	paniculata, Wall.			₹.	649
divaricata, Wall	•••	,,	657	parvifolia, Roxb.	•••			652
diversifolia, Wall	•••	"	647	pedata, Vahl	•••		"	661
dubia, Laws	•••	• • • • • • • • • • • • • • • • • • • •	661	pedicellata, Laws.			` >>	630
elegans, Kurs		"	659	peduncularis, Wal			"	655
elongata, Wall		"	658	pentagona, Laws.			"	646
ericolada, W. & A	•••	"	651	pentagona, Ham.		•••	"	651
erythroclada, Kurz		"	663	planicaulis, Hk. f.			"	658
furgate, Laws		"	646	polystachya, Wall			"	662
Gardneri, Laws	•••	77	676	polystachya, Wall.	•	••	"	662
gigantea, Bedd		"	648	pterisantha, Miy.		•••	"	664
glaberrima; Wall	•••	"	646	P Purani, D. Don		•••	"	652
glaberrima, Wall	•••	"	645	quadrangularis, H		•••	"	645
glabrata, Heyne	•••	"	652	repanda, W. & A.		•••	"	648
-landalan 177 17		"	652	repens, W. & A.	•••	•••	"	h46
-1 177 Pa A	•••	"	648	387-11	•••	•••	"	619
glauca, W. of A glauca, Wali	•••	"	646	repens, wall reticulata, Laws.	•••	•••	"	655
glauca, Wali glyptocarpa, Laws	•••	41	645	Rheedei, W. & A.	••	•••	"	658
gracilis, Wall	•••	79	653		•••	•••	"	6:8
T - J 107 - 11	٠,	657,		Roxburghii, W. &	<i>i</i>	•••	"	655
Walford Laura						•••	"	663
Helferi, Laws	•••	i.	662	rubifolia, Wall.	•••	•••	"	650
heterophylla, Wall	•••	"	653	rugosa, Hk. f. & T.		• • • •	o"1	
Heyneans, Wall	•••	"	647	rugosa, Wall				658
Heyncana, DC	•••	**	651	rumicieperma, Lau		•••	i.	661
himalayana, Brand.	•••	"	655	sagittifolis, Laws.	•••	•••	"	615
Hookeri, Laxs	•••	"	661	semicordata, Wall.	•••	•••	"	656
inequalis, Wall	•••	"	6±7	serratifolia, W. & A	•	•••	"	660
indica, Linn	• • •	"	653	serrulata, Wall.	•••	•••	"	659
indica, Ham	• • • •	. "	651	setosa, Wall	•••	•••	"	65±
indica, Thw	1.	651,		sikkimensis, Laws.	•••	•••	"	630
indica, Wall	•••	i.	652	spectabilis, Kurz	•••	•••	٠,	619
Kleinii, Wall		648,		sulcats, Laws	•••	•••	"	661
Labrusca, Linn	i.	651,	652	tenuifolis, W. & A.		•••	"	660
læta, Wall	•••	i.	648	ternata, Heyne	•••	•••	**	650
lanata, Roxb	í.	651,		Thomsoni, Laws.	•••	•••	"	657
lanata, Rozb	·	i.	651	tomentosa, Heyne	•••	• • •	.,	650
lanata, Wall	•••	,,	650	trichophora, Wall.	•••	•••	"	663
lanceolaria, Laws		"	660	trifida. Roth	•••	•••	??	650
lanceolaria, Wall	•••	"	661	trifolia, Linn	•••		"	654
lanceolaria, Wight	•••	"	661	triloba, Heyne	•••	•••	"	650
latifolia, Ham	•••	"	651	truncata, Miq	•••	•••	"	612
latifolia, Roxb		"	652	tuberoulata, Laws.	•••	•••	"	656
Linnsei, Wall	•••	"	649	tuberculata, Wall.	•••	•••	,,	661
lonohiphylla, Laus.	•••	"	646	vinifers, Linn	•••	•••	"	652
macrostachys, Miq	•••	,,	650	vulpina. Linn	•••	•••	"	653
mollis, Wall		"	660	Wallichii, DQ	•••	•••	,,	652
mollissima, Wall		,,	656	Wallichii, Kurz	•••	•••	"	647
montana, Laws		"	652	seylanica, Russ.	•••		"	652
muricata, W. & A	•••	"	660	sp., Wall		•••	٧i.	2 90
ncilgherrensis, Wight		"	656	Vitmannia elliptica, \	/uhl		i.	519
nervoss, Laws			650	lucida, Stoud	•••		11	519
nitida, Laws		"	662	Voandzeia subterraneo			٠.	
0-1/- TTT-77		"	662	lapsu Voandezia		•••	ii.	205
	•••	"	658	Vogelia, Lamk			iil.	481
obovata, Lars	••	"	657	arabica, Boiss	•••	•••	"	481
objects, Wall	•••	"	6±7	indica, Gibs			"	48L
pallida, W. & A	•••	"	660	Volkameria alternifoli	a. Bu			
paniculata, Heyne	•••	"		, , other is a seen in good	_,			

Volkameria	. Wal	Page	1	•	Val B	
Volkameria ,, angulata, Lour	iv.	598	Wallichia, Rosb	··· ···	Vol. P	418
dentata, Roxb	*** ***	598				419
diversifolia, Vahl	***))	598	caruotoides, Wall.	•••	. "	419
farinosa, Roxb	,,	592	3	•••		419
herbacea, Roxb	,,	592	disticha, T. Anders.	•••	••	429
infortunata, Roxb	*** ***	594	nana, Griff	•••	"	420
Kaempferi, Jacquen	,,	598	oblungifolia, Griff.		• "	419
multiflora, Burm	,,	590	Yome, Kurs		•••	419
nerii/olia, Boxb	,,	589	107-11/-1/- 10-0	•••		871
odorata, Roxb	*** ***	597	spectabilis, DO.			871
serrata, Linn	••	592		• • • • • • • • • • • • • • • • • • • •	iii.	98
urticifolia, Roxb	*** ***	594		77		. 98
urticifolia, Wall	*** **	594	Wallrothia articulata			585
sp., Griff	iv. 592	. 597	1			587
sp., Linn	iv.		W7-1 Dank		• • • • • • • • • • • • • • • • • • • •	563
Volutarella, Cass		888	0 1 0 0	•••		568
divaricata, Benth	••• ,,	888	hypolenca, Kurs	••• •••	" ;	564
Vossis, Wall. & Griff.	vii.		Planceolata, Wall.	•••	"	555
cuspidata, Griff	,,	151	3 771	•••	. " .	564
procers, Wall. & Griff.	,,	151	D1 131 D 1	•••	,,	664
speciosa, Benth	,,	152		.,	" 7	565
Vrydagzynea, Bl					. 565, C	
elhide RI	vi.	97		•••		568
gracilis, Bl	,,	97		••• •••		568
viridiflora, Hk. f	,,	96	Andreada III and	•••	"]	568
Vulpia Myuros, Gmel.		356	villosa, Wall	i. 563,		
Pseudo-myuros, Rohb.		356	77			564
Vuta (error for Vata),		-		··· ···		874
Res	v.	499		••• •••		374
2000	•••		All traditions (Com.)	••• •••		874
Wagatea, Dals	ii.	260	1	••• •••	"	874
		261	microphylla, Miq.		,,,,	144
Wahlenbergia, Br	"	570	1 "A." . '	··· ···		612
Wahlenbergia, Schrad.	iii.	439	tonglensis, Clarke	••• •••		612
agrestis, A. DC		429	Wattakaka viridiflora,			46
dehiscens, A. DO		429	TTT ()			101
P dicentrifolis, Clarke	,,	480			•	102
fragrans, Bl	,,	108		jii.	104,	
gracilia DC	• • • • • • • • • • • • • • • • • • • •	429		••• •••		
indica, A. DC	,,	429	1 1// 17		1	ĩĩi
lavandulæfolis, A. DC.		429	campaniflora, Hk. f.		."	106
	•••	429	777	•••	″ 1	106
peduncularie, Hk. f. &		480	Author Moon		" 1	102
perotifolia, W. & A		428	1 777 111 1	••• •••		102
purpurea, A. DC	•••	432		•••	",	108
quadrifida, A. DC	•	429		•••	" 1	112
rotundifolia, A. DC		432			"	102
Roylei, DC	••	488	fasciculat , Kurs	•••	. "	109
Sieberi, A. DO	••	429	777. 2	•••	"	108
thalictrifolia, DO		482	glomeriflora, Kurz	•••	"	102
viridis, A. DC	,,	481	grandifolia, Hk. f.		" ,	105
Wailesia paludosa, Robb.		19	77 . 10 771 0		",	107
picta, Lindl		. 19	1 77 13 . 777 4	••• •••	<i>"</i> ,	105
ادا ددد دخلاهدی وستددی					71 4	
Waldemaria araentea Kl	ots. iii	464	lanceolata. Moor		.,	182
Waldemaria argentea, Kl	ots. iii.	464			"	182 111
Waldemaria argentea, Klo Waldheimia tridactylites, I	ots. iii. Kar.		, congyrora, Aurz		,,	111
Waldemaria argentea, Klo Waldheimia tridactylites, I	ots. iii.	464 813 523	longifolia, Hk. f.		" "	

Webera •	Vol	. Page	Wendlandia	_	Vol.	Paga
macrophylla, Roxb i		, 102	puberule, DC	•		- 87
		. 103				90
				•••	. ,,	88
	,,	104	secunda, Griff	•••	. ,,	41
monosperma, $Hk. f. \dots$,,	103	Pspicata, DO		. ,,	41
? nilagirica, Hk. f	. ,,	106	sunatrana. Mia.			89
adamaan Dank	-	102	tenuiflora, Miq		•	89
	•• ••	112	P tetrandra, DC.	•••	•	
	,,			•••	. ,,	54
	•• ,,	108	tinctoria, DC	•••	. ,,	38
scandens, Boxb	,,	111	Wallichii, W. & A.	• • • • • • • • • • • • • • • • • • • •	. ,,	88
siamensis, Kurz	,,	111	? Wightiana, Wall.			41
-4.77. * TT1 #	•	158	Werneria, H. B. K.		• • • •	857
-4-11-1-4- TD: 4		104	Ellisii, Hk. f			857
Stellulata, Hk. J	,,	184				
	,,		nana, Benth			857
	,,	186	Whitleya stramonifoli	a,5wee1	t iv.	248
thyrsoidea, Roth	,,	40	Wightia, Wall		i₹.	257
truncata, Roxb	,,	94	gigantea, Wall.	į iv	257.	588
387-112-L <i>it</i> 778 8		103	Wikstroemis, Endl.			195
			canescens, Meissn.			
Websteria limnophila, Wrigh	ıt Yi				* **	195
	111		Chamadaphne, Mei		* **	195
bengalensis, ? Rich	,,	3 06	? hypericifolia, Mei	84D	• ••	196
	,,	306	inamæna, Meissn.			195
174 - 01	• • • • • • • • • • • • • • • • • • • •	307	indica, C. A. Mey.		•••	195
	,,	806	salicifolia, Done.			195
	,,			•••		
	,,	306	virgata, Meissn.	•••	• ••	195
scaberrima, Wall. (vid	8		viridiflora, Meisan.			195
	,,	307	Wilhelmsia caucasica,	C. Koci	h vii.	809
1 (1)-1-1	,,	808	Willoughbeia, Roxb.		iii.	623
		306	Burbidgei, Dyer			624
	,,	= = = =				
	,,	307	ceylanics, Thw.	•••		624
Weihea, $Spreng.$	11,		coriacea, Wall	•••	• ••	623
ceylanica, Baill	,,	441	edulis, Rowb	•••	. ,,	628
THE 12 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ii	. 3	firms, Bl		. ,,	624
11 12 12	iti.	37	flavescens, Dyer			625
		40	grandiflora, Dyer			625
	,,				•••	
	,,	38	martahanica, Wall.		• ••	624
biscuspidata, W. & A .	,,	40	oblongs, Dyer	•••	٠,	625
	,,	98	rufescens, Dyer	•••	,,,	626
9 17 17 187-19		38	tenuifiora, Dyer			625
cin mas Wall	•••	87	Willughbeig, Spreng.		•	88
	,,	89	auriculata, Spreng			88
	,,				•	88
? corymbosa, Wall	,,	41	oburata, Spreng.	• • • • • • • • • • • • • • • • • • • •	, ,,	
exserta, DC	,,	37	racemosa, Spreng.	•••		84
	,,	39	Winchia, A. DC		. 111.	63 0
T		40	atro-viridis, Kurz	•••	,,,	626
	. "	39	calophylla, A. DC.		••	680
	,,	39	cirrhifera, Garon.		• • •	624
	,,				•	
Lawii , <i>Hk. f.</i>	,,	40	WINTERBA	···		89
Lawsoniæ, DC	,,	56	Winterlia uliginosa,	Spreng		569
	,,	39	Wisneria, Mich		vi.	561
		95	triandre, Mich.		٠,,	562
	. ,,	39		•••		825
	,,	95	Leschenaultiana,		•	825
	٠٠ ,,				•••	
	,,	38	periplocifolia, Thw.		. ,,	825
777 . 77	,,	40		•••	. ,,	825
paniculata, DC	,,	39	zeylanica, Medik.	•• ••	. ,,	825
		41	Wisteria pallida, Dala		L ÍÍ.	105
	••• 11	99	racemosa, Dalz. & (105
prozima, DO	••• 91	90	1 .200,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		, ,,	

	Vol.	Page i	Xenthium	Vol.	
Withenie, Paug		239	brevirostre, Wallroth	iii.	808
coagulars, Dunal	,,	240	discolor, Wallroth	,,	808
somnifera, Dunal		289	indicum, DO	,,4	808
Wolffia, Horkel		557	orienta's, Bl	,,	803
arrhisa, Wimm	,,	557	Rozburghii, Wallroth	"	808
Delilii, Kurs		557	Strumarium, Linn	,,	808
Michelii, Schleid		557	Xanthochymus, Roxb	i.	269
microscopics, Kurz	••	558	dulcis, Roxb	,,	269
Woodfordia, Ralisb	iï.	572	ovalifolius, ? Bedd	,,	269
floribunda, Salisb		572	ovalijolius, Roxb	,,	269
fruticosa, Kurs		572	picto.ius, Roxb	,,	269
tomentosa, Bedd	••	572	tinctorius, DC	,,	269
Woodrowia, Stapf vii.	241,	421	spicatus, W. & A	,,	269
diandra, Stapf	vii.	241	XANTHOPHYLLUM, Rorb.	1.	208
Woollastonia bistora, Dalz. &			acuminatissimum, Miq.	,,	210
Gibs	iii.	806	affine, Korth	,,	209
biflora DC	22	806	angustifolium, Wight Arnottianum, Wight	4 ,,	209
bistora, Wight	"	806	Arnottianum, Wight	,,	209
scabriuscula, DC	"	306	ellipticum, Korth	,,	211
Wormia, Rottb	-	35	flavescens, Roxb	,,	209
bracteata, Hk. f. & T	"	87	flavescens, Roxb	,,	209
dentata, DC		35	flavescens, Wall	,,	209
ezcelsa, Hk. f. & T	"	35	glaucum, Wall	,,	209
excelsa, Jack	"	85	Griffithii, Hk. f	,,	210
hamata, Vahl		299	insigne, A. W. Benn.	,,	211
integra, Hk. f. & T	9:	87	Maingayi, Hk. f	,,	210
oblonga, Wall	"	35	obscurum, A. W. Benn		211
pulchella, Jack	"	86	paniculatum, Miq		209
subsessilis, Miq		85	Roxburghianum, Wight	,,	209
suffruticosa, Grif	"	85.	rufum, A. W. Benn.	*** ***	210
triquetra, Rottb	"	35	atipitatum, A. W. Benn		210
Wrightea, Roxb	vi.	419	undulatum, Wight	17	209
caryotoides, Roxb	,,	419	_virens, Roxb	,,	209
Wrightia, Br	iiı.	652	Xanthoxylon, see Zanthe		400
angustifolia, Thw	19	653	lum		492
antidysenterica, Br	"	654	Xeropappus (anuainosus, \	78. J. 111.	
antidysenterica, Grah	22	644	Xerospermum, Bl	j.	
o occinea, Sims	"	654	Noronhianum, Bl. i. 6	35, 686,	690,
Coraia, Wall	99 -	653			691
Hamiltoniana, Wall	"	658	Xerotes leucocephala, Br.	vi.	
lanvis, Hk. f		654	Ximenia, Linn	i.	574
mollissima, Wall	,,	653	æyyptiaca, Juss	,1	574
religiosa, Benth	, ,,	653	ægyptiaca, Rozh	,,	522
Rothii, G. Don	,,	658	americana, Willd	,,	574
tinctoria, Br	,,,	653	lanceolata, DC		498.
tinctoria, Roth	* **	653	? olacoides, W. & A	i. 574	
tomentosa, R. & S	. ,,	653	Russeliana, Wall	i,	574
Wallichii, A. DC	18	653	Xiphion Aitchisoni, Baker		272
merianica. Br	_ 27.	654	Donianum, Alefelde	"	272
Wulfenia, Jacq iv.	. 29 0,	784	Xiphocarpus candidus, Ha		111
Amherstians, Benth	, i v .	291	Xipholepis aspera, Steetz		288
intermedia, Wall Notoniana, Wall	, ,,	867	silhetensis, Steetz	,	232
Notoniana, Wall	,,,	866	Xiphosium	v.	786
obliqua, Wall	. ,,	867	acuminatum, Griff	,,	808
Wurfbainia, Giseke	, v i.	241	Xylia, Benth	ii.	286
	•••		dolabriformis, Benth.		286
Xanthium, Linn	iii.	808	Xylocarpus ? Antila, Ham	1 1.	568

-							
Xylocarpus	Vol.	Page	Youngia	,		Vol.	Page
Granatum, Kop	i.	567	fastigiata, DC		•••	iħ.	895
moluccensis, Rtem	"	567	fuscipappa, Thw.	•••	•••	**	895
obovatus, A. Juss	**	567	glauca, Eigew.	•••	•••	"	394
Xylophylla Lucena, Roth	v.	329	Kochiana, Ledeb.	•••	•••	"	398
obovata, Willd	•	328	lyrata, Cass napifolia, DC	•••	•••	"	395
Xylopia, Linn	i.	82	napifolia, DC	•••	•••	"	395
Xylopia, Linn	"	85	napifolia, Wight	•••	•••	,,	895
Championii, Hk. f y T.	"	84	Poosia, DC	•••	•••	"	895
dicarpa, Hk. f. & T	"	85	runcinata, DC	•••	•••	,,	395
elliptica, Maing	"	86	striata, DC	•••	•••	",	395
ferrugines, Hk. f. & T	23	83	Thunbergiana, DC.	•••	•••	,,	8 99
fusca, Mainy	"	83	l - .				
magna, Maing	"	84	Zalacoa, Reinw	•••	•••	٧i.	472
Maingayi, Hk. f. & T	"	85	affinis, Griff	•••	•••	,.	472
malayana, Hk. f. & T	"	83	Beccarii, Hk. f. conferta, Griff.	•••	•••	,,	474
uigricans, Hk. f. & T	"	84	conterta, Griff.	•••	•••	,,	473
obtunifolia, Hk. f. & T.	•>	83	edulis, Reinw	•••	•••	"	472
.oxyantna, Hk. f. & T	"	83	edulis, Wall	•••	•••	77	473
parvifolia, Hk. f. & T	"	84	glabrescens, Griff.		•••	**	473
pustulata, Hk. f. & T	"	85	macrostachya, Griff		•••	"	473
XYLOPIEÆ	1.	46		•••	• •	"	478
Xylosma, Forst	i.	194	secunda, Griff.	•••	•••	,, '	472
controversum, Clos	"	194	Wallichiana, Mart.		•••	"	473
latifolium, Hk. f. & T	"	194	Zaleya decandra, Bur		•••	11.	66 L
longifolium, Clos	"	194	Zamia Corsoniana,			₹.	657
Xylosteum asperifolium (as-		10	Zannichellia, Linn.		•••	Vi.	568
perrimum), Done	iii.	12 12	gibberosa, Rchb.	•••	•••	"	568
purpurascens, Done	"		palustris, Linn.	•••	•••	"	568
spinosum, Done	"	13	pedicellata, Ham.	. • • •	•••	.99	568
XYRIDEE	vi.	364	pedunculata, Rohb.		•••	"	568
Xyridion aureum, Klatt	₹i.	273	tenuis, Rout		•••	2:	570
Nothum, Klatt	.,	272 27 2	Zanonia, Linn		•••	11,	633
spurium, Klatt	"	364	cissoidea, Wall.	•••	•••	"	633
Xyris, Linn	Vi.	364	clavigera, Wall. Pheterosperma, Wa	i	• •	"	634
anceps, Lamk	"	366	indica, Linn		•••	,,	632 638
bancana, Miq	٠,	366	lara, Wall	•••	• • •	"	633
capensis, Thunb	"	364	medata Mia	•••	•••	11	683
indica, Linn indica altera, Vahl	"	365	pedata, Miq sarcophylla, Wall. Wightiana, Arn.	•••	•••	"	684
	"	366	Wightiana.		•••	"	688
lappacea, Heyne malaccensis, Stend	,,	365	ZANONIEÆ	•••	•••	iï.	605
nilgarensis, Stead	"	365	Zantedeschia aromat		Ċ.	•••	000
oryzetorum, Miq	"	365	Koch	•		vi.	532
10 777717	"	365	cordata, C. Koch			"	532
robusta, Mart	**	364	fætida, C. Koch		•••	"	532
schoenoides, Mart	"	365	rubens, C. Koch		•••	"	532
Walkeri, Arn	"	365	virosa, C. Koch	•••		"	524
Wallichii, Kunth	"	365	ZANTHOXYLEE	•••	•••	ï.	484
sp., Griff • '	"	365	Zanthoxylum, Linn.	•••	•••	i.	492
Xystidium barbatum, Presl	vii.	98	acanthopodium, Do			••	498
maritimum, Trin	,,	98	alatum, Rosb	•••	•••	"	498
11001 10011001111 22-11	"		alatum, Wall	•••		"	498
Yoania, Maxim vi.	123,	180	armatum, Roxb.			"	496
	vi.		P Bajarnandia, Wal	11.	•••	"	496
	iii.		Budrunga, Wall.		•••	"	495
ambigua, DC	"	895	Budrunga, Roxb.		•••	22	495
diversifolia, Ledeb	"	895	? connarvides, W. &	Α.		496.	565
unuarayoud, madaa	"						

			<i>c.</i> •
Zanthoxylum-	Val	Page	Zehneria / Vol. Page
		495	
crenatum, Wall	i,		1 0000,0, 2100,0
cuspidatum, Ohamp	99	494	umbellata, Thw ,, 625
? Finlaysonianum, Wall.	"	496	Zenkeria, Trin vii. 270
	"	497	-la (Two 970
floribundum, Wall	"		, , , , , , , , , , , , , , , , , , , ,
Hamiltonianum, Wav	,,	494	obtusifiors, Benth ,, 270
hostile, Wall		498	Zeocriton disticum, Beauv. vii. 871
	•	494	D 979
kbasiauum, Hk. f	99		, ,, ,,
Lamarckianum, Cham	"	488	secalinum, Beauv ,, 872
? longifolium, Wall	,,	496	Zephyranthestubispatha, Herb. vi. 277
Justidum Wall		492	Zerumbet speciosum, Jacq vi. 256
lucidum, Wall	"		The state of the s
Marambong, Miq	99 -	488	Zingiber, Leet ,, 247
myriacanthum, Wall	,,	496	Zeuxine, Lindl vi. 106, 179
in		497	1 11 14 777 6
	"		1
nitidum, Wall	"	497	affinis, Benth ,, 108
oblongum, Wall	"	495	bracleata, Wight ,, 106
obtusifolium, Poir		496	brevifolia, Wight , 106
	"		107
ovalifolium, Wight	"	492	1
ovalifolium, Wight	,,	498	flava, Benth ,, 109
oxyphyllum, Edgew		494	goodyeroides, Lindl , 107
	,11		I indecember Tindl 108
planispinum, Sieb. & Zucc.	"	493	, , , , , , , , , , , , , , , , , , , ,
ptelexfolium, Cham	**	438	longifolia, Hk. f ,, 109
Rheten, DO i.	495,	496	longilabris, Benth ,, 107
		496	members are Tindl 108
rhoifolium, Lamk	i.		,,
Roxi urghianum, Cham	"	487	moniliformis, Griff ,, 165
Rumphianum, Cham	**	499	moulmeinensis, Hk. f ,, 109
1 114 11 187 11		496	100
	"		1
sepiarium, Wight	99	493	procumbens, Bl ,, 107
Serra, Turcz i.	2.6,	496	regia, Benth ,, 108
sorbifolium, St. Hil	i.	496	maniformia III. 6
	••		1 2022000
spondiæfolium, Wall	"	496	1 101 111 11 11
tetraspermum, W. & A	,,	494	sulcata, Lindl vi. 106, 197
? Timbor, Wall	"	493	Tripleura, Lindl vi. 108
Assumed lam III		498	mt 11 A.11 040
tomentellum, Hk. f	"		
triflorum, Tarcs	,,	496	barbatum, Wall, 244
triloliatum, Linn. lap-u			capitatum, Roxb ,, 248
T 47 7	if.	726	On any park 949
			,
triphyllum, Wight	i.	487	cernuum, Dals ,, 245
violaceum, Wall	,,	494	ohrysanthum, Rosc ,, 243
		487	Olumbai Pina 949
	?"		(1):453:- 1 949
Zapania nodistora, Lamk	17.	563	
repens, Bert. lapsu I	**	563	corollinum, Hance ,, 249
Zes, Linn		103	cylindricum, Moon 247
-/L- W:11		102	alatum Davh 940
0.000, M111,	91		, , , , , , , , , , , , , , , , , , , ,
americana, Mill	"	102	flavescens, Link ,, 248
Mays, Linn	"	102	gracile, Jack ,, 246
segetalis, Salisb		102	() -ide Lit Dallan 948
	••	102	intermediam Paker " 948
velgaris, Mill	, n		, , , , , , , , , , , , , , , , , , , ,
Zehnelia, Endl	iı.	624	ligulatum, Roxb ,, 245
amplesicaulis, W. & A	41	625	ligulatum, Wall ,, 248
70	-	624	magazata ahumum Dala 947
16	•••		
cerasiformis, Stocks	"	680	marginatum, Rozb ,, 249
connivens, Mig	,,	625	Missionis, Wall ,, 246
	"	624	mandanum Tinle 949
	,,		
Garcini, Stocks	"	680	nigrum, Gaerta ,, 254
hastata, Miq		625	Nimmonii, Dals ,, 244
Hookeriana, Arn	••	624	odoriferum, Bl ,, 249
mucronata, Miq	••	624	officials Desc. 9/7
	97	444	OMCIDALO, KOSC ,, ZEO

Zingiber)	Vol	. Page	Zizyphus		_
mandana ma Daul	vi		nummularia, W. & A		Page
mandaahailum 147-11		045	h obligger Hawsa	. 1.	683
Danishii 1774 A	••	040	(Tronlie Mill		886
maramarama Dono		040	0 mm o o (4/4/2/2/2 - 197 - 19	. ,,	684
MORANIM Done	,,	044	oppositijouz, wall	. ,,	641
mhone: Deal	,,	0.40		. ,,	631
ementahila <i>Guit</i>	,,	0.477	ornata, Mic	, ,,	686
anauniaum Warm	••• ,,	0.477	oxyphylla, Edgew	., ,,	634
BOMBTTORTO Rowh	••• ,,	945	pallens, Wall	. ,,	684
TITLE LA	,,	944	paniculata, Roth	. ,,	636
Winhelenne The	,,	.044	pedicellata, Wall.		684
Manmhat C.	,,	0.47	racemosa, Wall.		270
TD1	,,	040	rotundifolia, Lamk.	. i.	638
O	••• ,1	247	rotundifolia, Roth	• •,	634
· m Dance	,,	040	rufula, Miq	. ,,	684
77	yi		rugosa, Lamk	. ,,	636
	• ii		ruminata, Ham.	. ,,	684
1771			sativa, Gertn	. ,,	633
eilista Omnone			scandens, Roxb	. ,,	634
	,,	94	P sinensis, Lamk	. ,,	623
7	?		Sororia, Schult.	. ,,	682
Minmahan Tura].	630	Spina-christi, Linn.	. ,,	687
	i.		P tomentosa, Roxb	. ,,	686
., .,	,,	684	trinervia, Roth	. ,,	432
amakala TTI E	,,	684	trinervia, Roxb	. ,,	683
D 1. / 11	••• ,,	685	P venulosa, Wall	• ••	636
Baenchia, Wull		637	vulgaris, Lamk	. ,,	633
Bhunder, Royle	•	8, 687	wynadensis, Bedd	. ,,	683
? Burwa, Ham	i,		zylopyrus, Willd	. ,,	634
calophylla, Wall	,,		Zoduba Masuca, Ham		851
Caracutta, Roxb	• • • • • • • • • • • • • • • • • • • •		Zoegia, Linn	. iii.	884
celtidifolia, DC	,,		aristata, DC	. ,,	884
	,,	684	purpures, Fresen		384
Pelegans, Wall	,,		Zollikoferia chondrilloides, D	C. 111.	
	,,		glomerata, Boiss	. ,,	417
ferruginea, Heyne	,,		mucronata, Bciss	• ,,	415
	,,		nudicaulis, Boiss		416
flewuosa, Wall	,,		Zollingeria, Kurz	. i.	692
	,,		macrocarps, Kurz	."	632
funiculosa, Ham	,,		Zollingeria, Schultz	. 11	248
glabra, Roxb	,,		scandens, Schultz		248
glabrata, Heyne	91		Zornia, Gmel	11.	147
globularis, Wall	••• **		angustifolia, Sm	. ,,	147
hamosa, Wall	7		conjugata, Sm	. ,, '	148
	,,		diphylla, Pers	•••	147
	,,			. ,,	14L
	,,	685	dycticarpa, DC	. ,,	147
	,,	682	gibbosa, Spanoghe	. ,,	147
latefolia, Roxb	,,	686		. ,,	147
	··· a	685	pulchella, Pers	. ,,	162
Lotus, Lamk		3, 637	strobilifera, Pers	. ,,	227
	i.	685	Walkeri, Arn	. ,,	148
	"	682		. ,,,	148
	"	688	Zornia, Moench	. iv.	665
Napeca, Willd	,,	685	nutans, Moench	• • • • • • • • • • • • • • • • • • • •	H65
	,,	685	Zosimis, Hoffm	. 11.	717
Napeca, Ruxb	··· _2	684	absinthifolia, DC	. ,,	717
nitida, Roxb	i. 638	5, 687	orientalis, Hoffm	. 11	717
•• •					

			y , -
Zosimia	Vol.	Page	Zoysia / Vol. Page
radians, Boiss. & Hohen.	ii.	717	setacea, Nees vii. 99
tragioides, Boiss	. ,,	712	sinica, Hance ,, 99
Zostera ciliata, Forsk	▼ 1.	57 0	tenuifolia, Trin ". 99
uninervis, Forsk	,	570	P tremula, Beauv " 250
Zosterostylis Arachnites, Bl.			Zorsie.e vii. 3, 96
Walkers, Wight	11	118	Zwardekronia lurida, Korth. iii. 177
seylanica, Lindl	"	118	Zygomenes avillaris, Salisb. vi. 389
Zoysia, Willd vii.		421	ZYGOPHELLEE i. 422
aristata, C. Muell	,,	99	Zygophyllum, Linn i. 424
Brownii, C. Muell		99	coccineum, Linn ,, 425
' Codia, Ham		19	P connaroides, W. & A ,, 565
Griffithiana, C. Muell		99	simplex, Linn ,, 424
japonica, Wendl		99	Zygospermum seylanicum,
pungens, Willd		99	Thw v. 305
. sedoides, O. Muell		99	

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